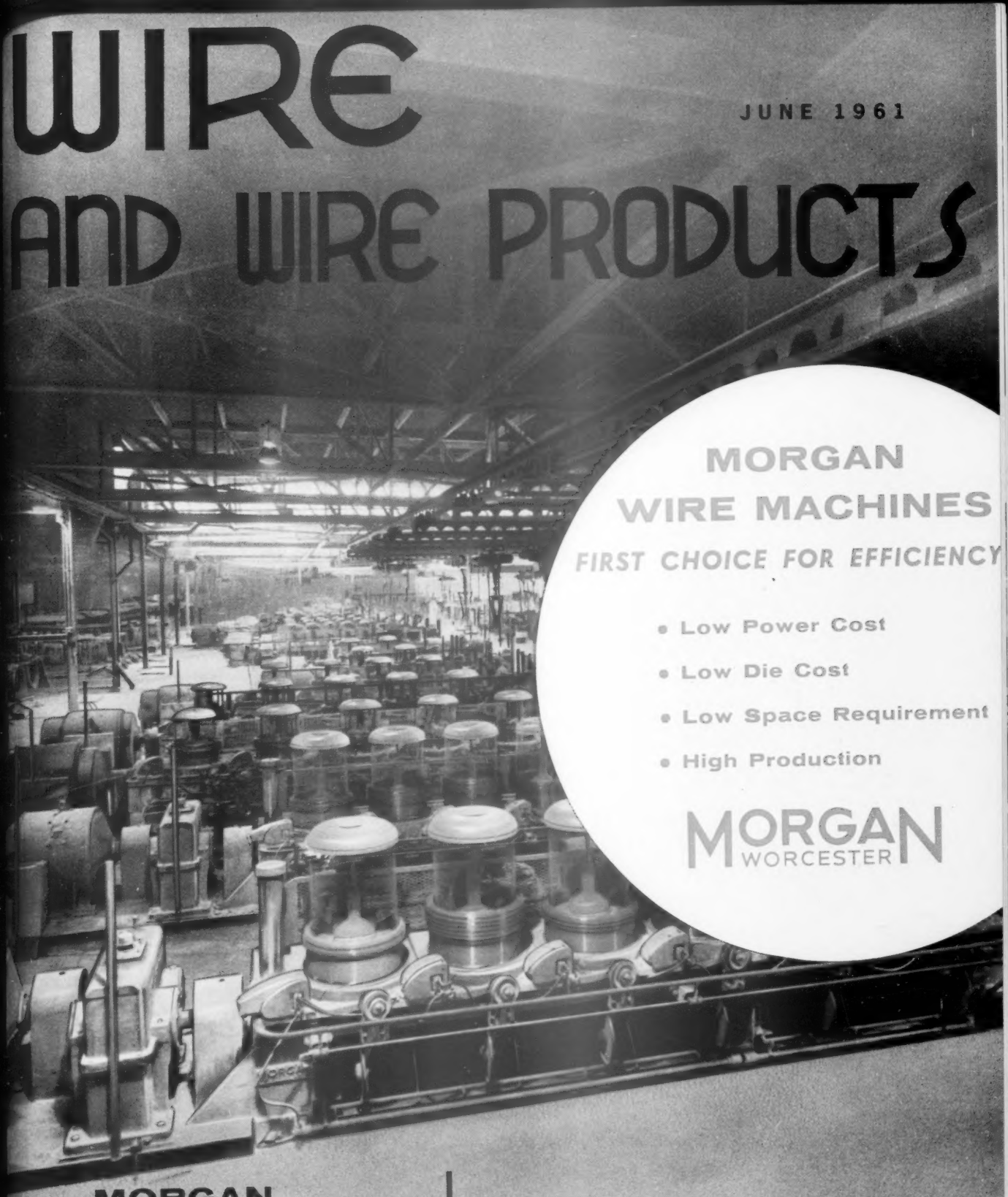
WIRE AND WIRE PRODUCTS

JUNE 1961



MORGAN
WIRE MACHINES
FIRST CHOICE FOR EFFICIENCY

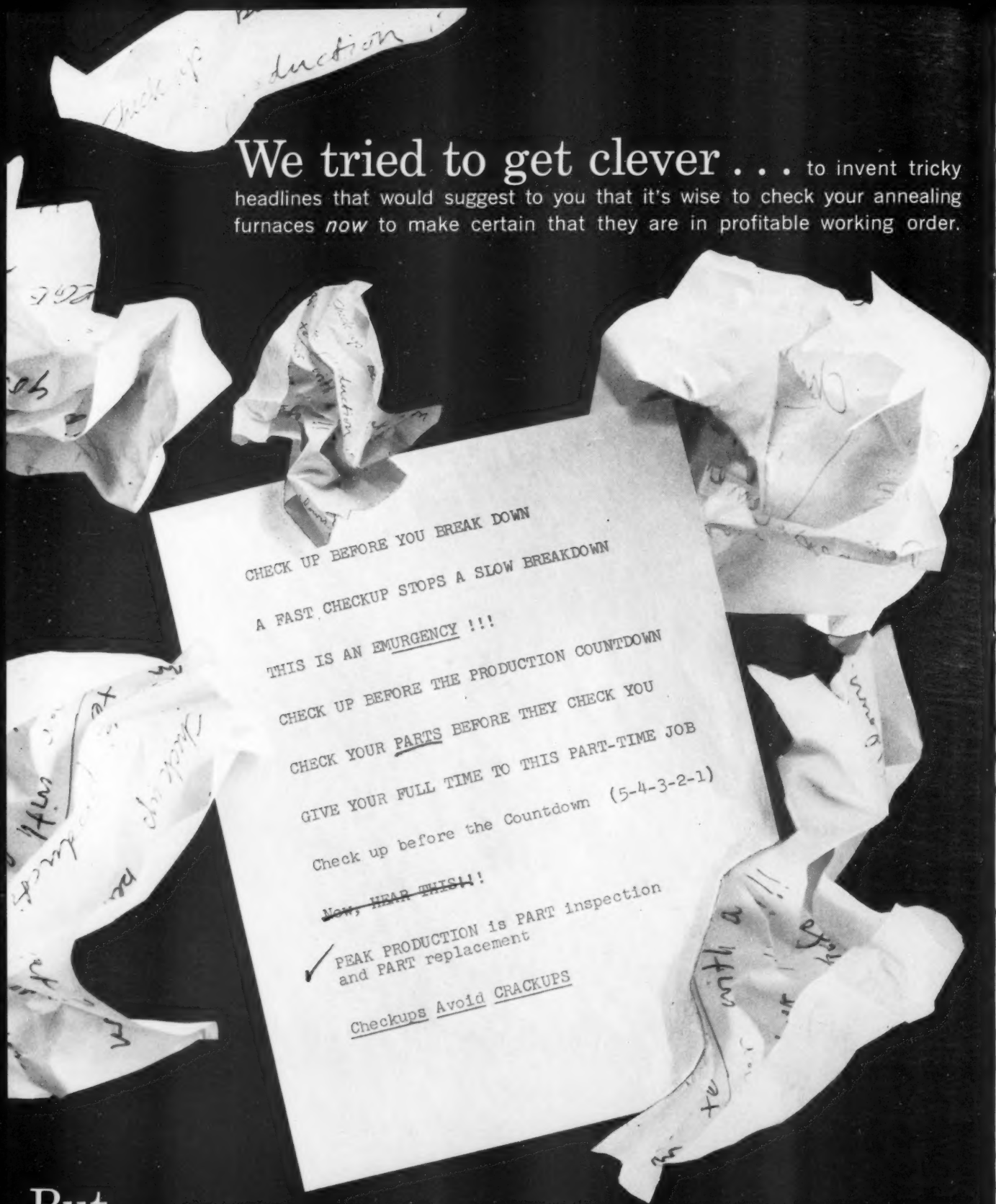
- Low Power Cost
- Low Die Cost
- Low Space Requirement
- High Production

MORGAN
WORCESTER

MORGAN
CONSTRUCTION
COMPANY

WORCESTER, MASSACHUSETTS

FICIAL PUBLICATION OF THE WIRE ASSOCIATIO


CHECK UP BEFORE YOU BREAK DOWN
A FAST CHECKUP STOPS A SLOW BREAKDOWN
THIS IS AN EMURGENCY !!!
CHECK UP BEFORE THE PRODUCTION COUNTDOWN
CHECK YOUR PARTS BEFORE THEY CHECK YOU
GIVE YOUR FULL TIME TO THIS PART-TIME JOB
Check up before the Countdown (5-4-3-2-1)
Now, HEAR THIS!!
PEAK PRODUCTION is PART inspection and PART replacement
Checkups Avoid CRACKUPS

We tried to get clever . . . to invent tricky headlines that would suggest to you that it's wise to check your annealing furnaces *now* to make certain that they are in profitable working order.

But . . . after looking over our efforts, we decided the best approach would be a straight reminder that better business is being forecast — and to urge you to make sure your annealing equipment is in first-class condition to take full advantage of busier days. Our Parts Department can fill your order promptly.

Lee Wilson Engineering Co., Inc., 20005 Lake Road, Cleveland 16, Ohio.

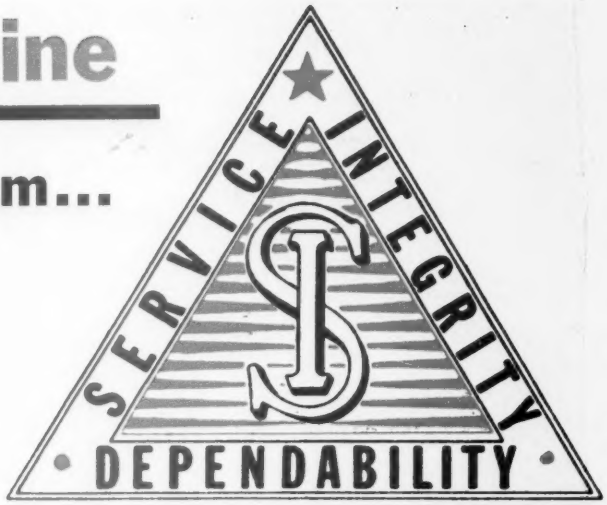
Lee Wilson

ORIGINATORS AND LEADING PRODUCERS OF HIGH CONVECTION ANNEALING FURNACES

The best Medicine

can't cure your problem...

if you don't use it. If you have greater efficiency in mind you will find our new products to be the answer!



AQUALUBE 268

COLOR-IDENTIFIED, WATER-SOLUBLE. FOR DRAWING COPPER TUBING AND COPPER WIRE. PERFECT SOAP/FAT BALANCE.

AQUALUBE 269

COLOR-IDENTIFIED LUBRICANT. REPORTED TO PERFORM EXCELLENTLY IN DRAWING STAINLESS TUBING FOR USE IN NUCLEAR REACTORS.

WIRE DRAW NO. 788

POWDER LUBRICANT FOR NAIL WIRE STOCK. BETTER DRAWING, CUTTING AND CLEANING. RUST PROTECTION DURING WAREHOUSING.

BC-ADDITIVE

NON-PREFERENTIAL ADDITIVE TO BORAX COATING SOLUTIONS. EXCELLENT WETTING, IMPROVED DRAWING, REDUCED SLUDGING.

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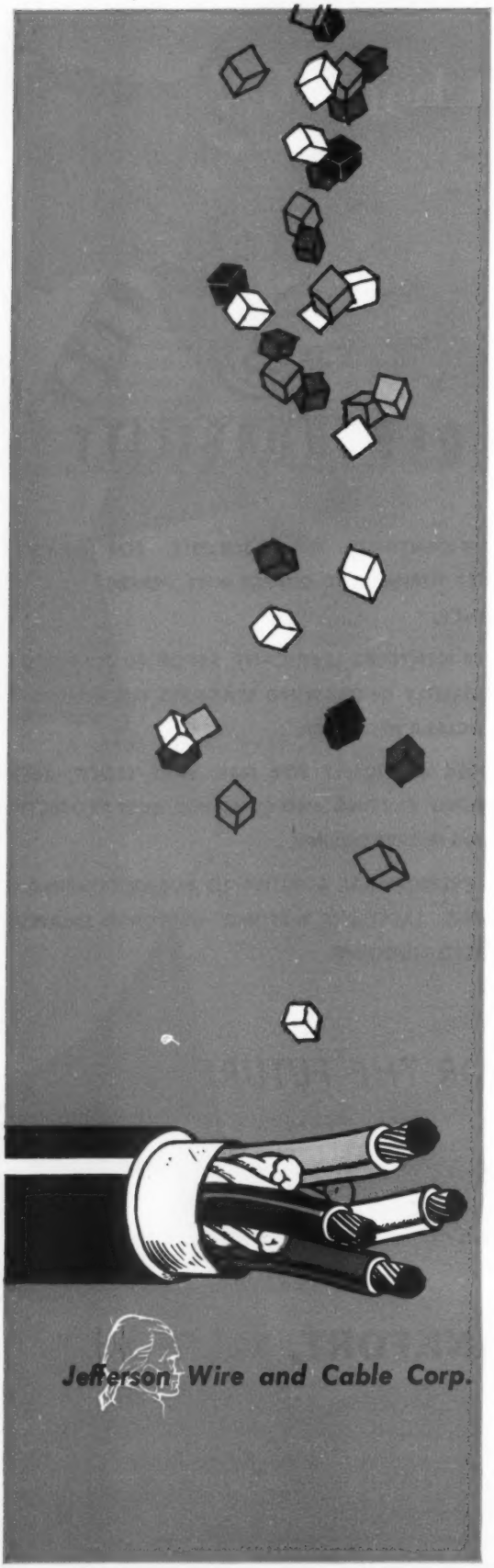
Standard Industrial has pioneered in most of the outstanding contributions to better wire drawing through better lubricants. Consult Standard Industrial for the solution of your difficult problems.



HOW TEAMWORK INTRODUCED A NEW SHAPE IN VINYL COLOR CONCENTRATES

Jefferson Wire and Cable Company, Sutton, Mass., a fast growing wire manufacturer, who prides itself on the fact it can supply 1,000 or 1,000,000 feet of wire with the same degree of service and quality, approached the Blane Corporation with a problem regarding uneven color dispersion caused by powdery deposits found in granular type color concentrates.

Jefferson knew that Blane was doing work in the area of developing vinyl color concentrates utilizing pellets in place of a granular product, and requested a product that would meet the following requirements:

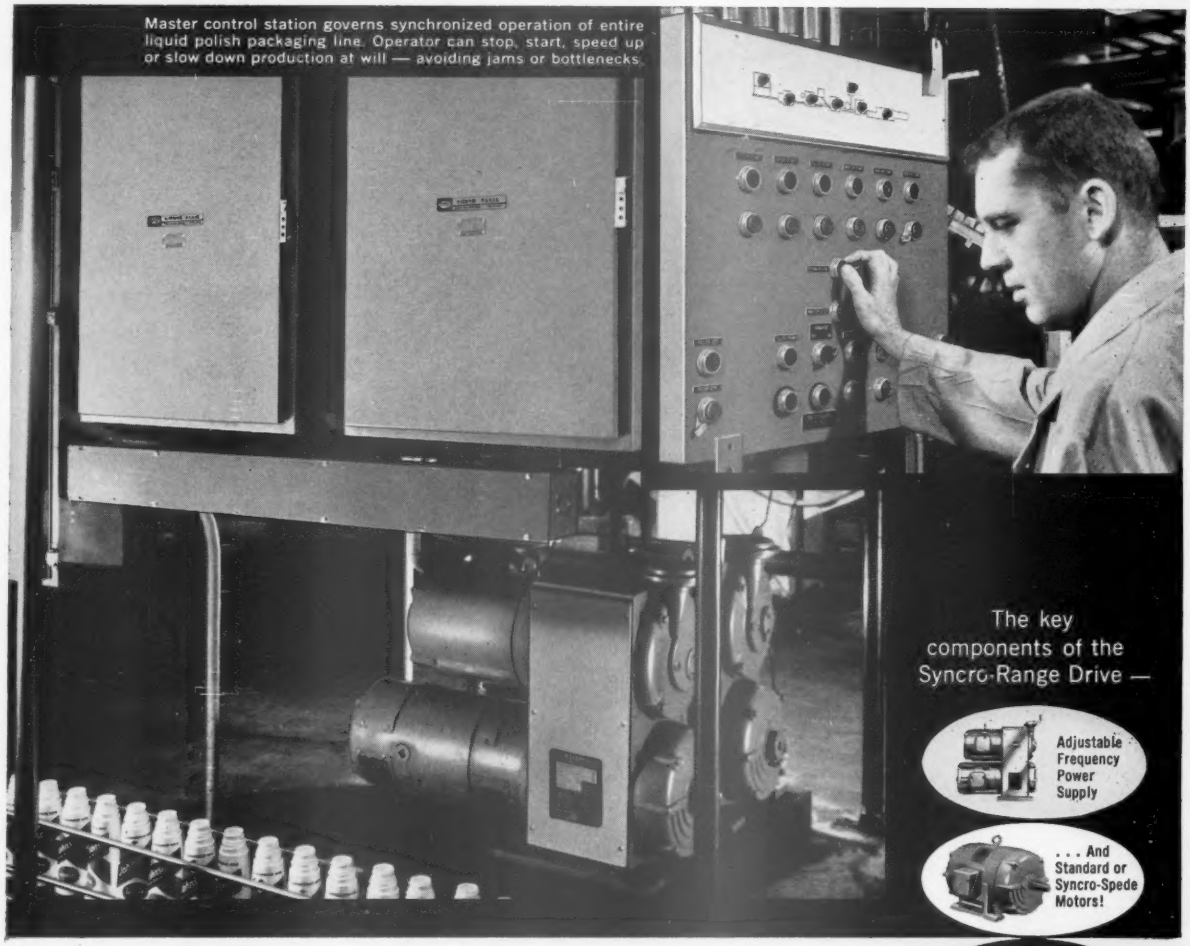
1. *Be free from fines and powdery deposits*
2. *Have full color strength–in a range of NEMA colors*
3. *Have good electrical properties*
4. *Give a smooth, streak free extrusion*
5. *Have greater over-all economy*

The result is Blane vinyl color concentrates — a uniform size pellet which gives even, rapid and full color dispersion under heat. Blane pelletized color concentrates, when tumbled with natural, pelletized vinyl compounds, will result in a smoother, streak free extrusion with no plant dusting problems.

This is another example of industry teamwork in action. We, at Blane, will be pleased to work with other wire and cable manufacturers in the areas of special colors, custom compounds for specialized requirements or current or long term insulation problems.

Blane

THE BLANE CORPORATION
CANTON, MASSACHUSETTS


Master control station governs synchronized operation of entire liquid polish packaging line. Operator can stop, start, speed up or slow down production at will — avoiding jams or bottlenecks.
The key components of the Syncro-Range Drive —
Adjustable Frequency Power Supply
. . . And Standard or Syncro-Spede Motors!

LOUIS ALLIS SYNCRO-RANGE DRIVES automate liquid polish lines

Johnson's Wax, renowned wax and polish producer, uses Syncro-Range Drives for exact control of process lines

Controlling the speed of the precise, mass-production lines for their new, highly successful liquid shoe polish was the task Louis Allis engineers had to solve for Johnson's Wax.

The problem was to time the flow of plastic bottles, liquid polish, wool daubers, and caps into the packaging lines at precisely equal rates. Flow rate must be adjustable so the lines can be slowed down or speeded up. And the entire packaging operation must be controllable from a single master control. The Louis Allis Syncro-Range Drive solved the problem.

Syncro-Range Drive provides synchronized speed of any number of motors from a single control. It is a "packaged system" comprising an adjustable frequency power supply operating on 3 phase, 60 cycle power input . . . a group of Syncro-Spede® synchronous motors which maintain exact synchronism regardless of varying load . . . and a control which permits the speed of the entire group of motors to be simply adjusted without losing synchronization. On applications for which exact synchronism is not required, standard squirrel cage motors can be supplied.

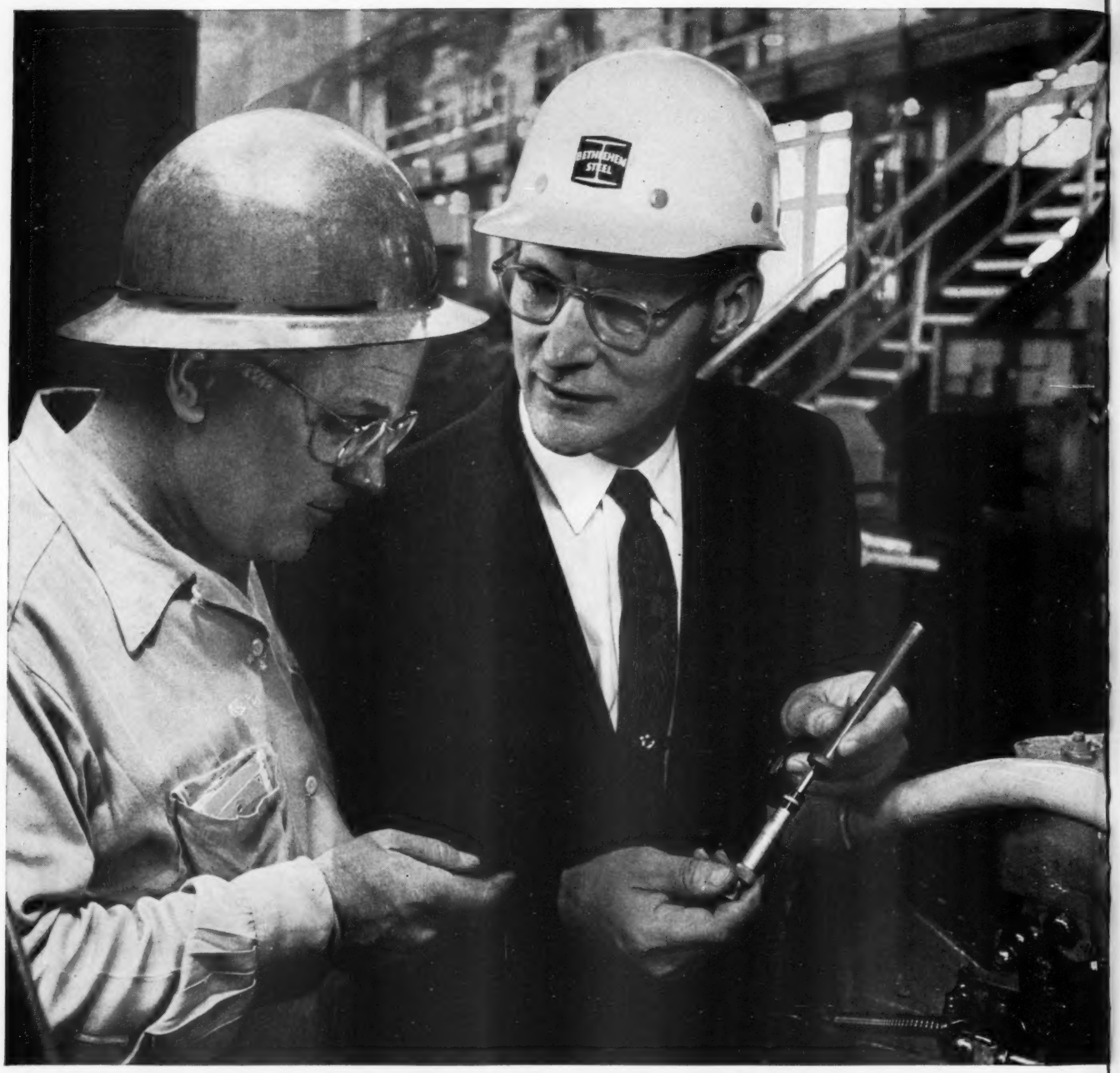
You can readily see the advantages of the Syncro-Range Drive in systems or processes which require synchronized movement: multiple conveyors which feed consecutively; transfer lines; process lines; assembly lines requiring coordinated arrival of components; printing where one press feeds another; synthetic fibre spinning, drawing, or twisting; metal runout tables; and other similar machines which require the application of power at a number of points on the machine.

The Syncro-Range Drive is available with a choice of drive sizes to efficiently control from 2 to 200 motors. Control features are available to provide speed regulation accurate to 0.1% with 0% relative speed difference between motors! A trained Louis Allis motor application engineer is available to help. You can reach him at your local Louis Allis District Office, or by writing to The Louis Allis Company, 451 East Stewart Street, Milwaukee 1, Wisconsin..

ASD-232

LOUIS ALLIS

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES



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right in your plant

Steel

for Strength
. . . Economy
. . . Versatility

Even before you place your order, one of our metallurgists will sit down with your engineers to find out what it is you want the wire to do. He'll work with them to determine the right wire for the application—whether you cold-head or coil . . . weave or weld. It's all a part of your Bethlehem order.

And if you're just starting a production run with Bethlehem wire, you can have one of our metallurgical engineers "at your elbow" to advise you. He'll bring his wire experience right into your plant—at no obligation to you. Just call the nearest Bethlehem sales office, or write to us at Bethlehem, Pa.

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WIRE AND WIRE PRODUCTS*

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 36 June, 1961 No. 6

Designated as Official Publication By The Wire Association

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For those small spring wires too tough for pliers, try our #4 TODD cutter.

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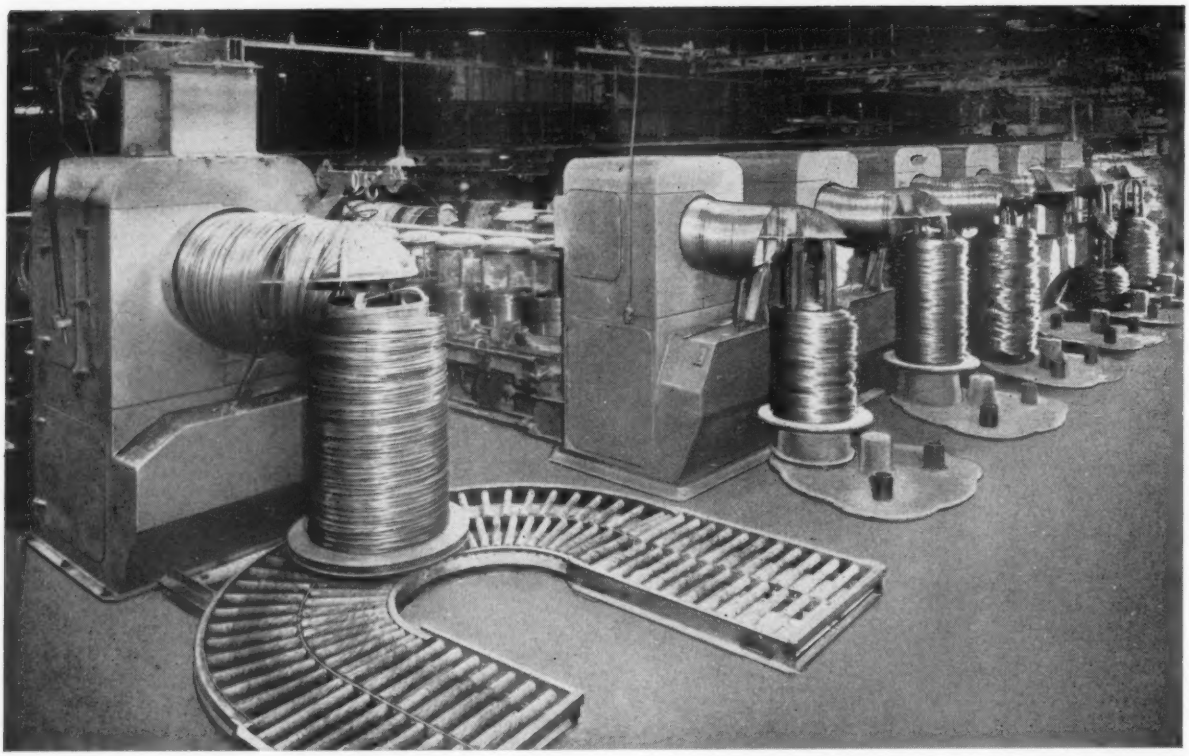
Please feel free to consult us with your wire cutting problems.



A portion of Whitacre Wire Drawing Dead Block installations at Sheffield Division of Armco Steel Corp. at Kansas City

FACTS SPEAK LOUDER THAN CLAIMS!

In actual operation Whitacre Wire Drawing Dead Blocks have delivered . . .

40%

Increase in Production

39%

Decrease in Costs!

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SILICONES

Three months on the shelf...

YET NEW SE-9008 SILICONE RUBBER WIRE AND CABLE COMPOUND CAN STILL BE USED WITHOUT MILLING!

General Electric's non-milling silicone rubber compound SE-9008 is the *only* quality wire and cable compound you can buy that keeps freshened life *for three full months!* You can now cut way down on your processing costs, and provide wire and cable with high performance capabilities at moderate cost.

SE-9008 comes in coiled "hats" ready to feed *automatically* into your extruder. No pre-milling, no modifications, no special dies required.

Strips comes 2" wide, and either ½" or ¼" thick, whichever you require. Available for either hot air or steam vulcanization.

SE-9008 is excellent for power cable, fixture wire, motor and apparatus wire, and other commercial and military applications.

SE-9008 is moderately priced, and possesses good electrical and physical properties. Meets Underwriters Laboratory requirements for silicone rubber insulated fixture wire.

SE-9008 is another cost-saving product from General Electric, who supplies more silicone rubber for wire and cable insulation than all the other suppliers *combined!*

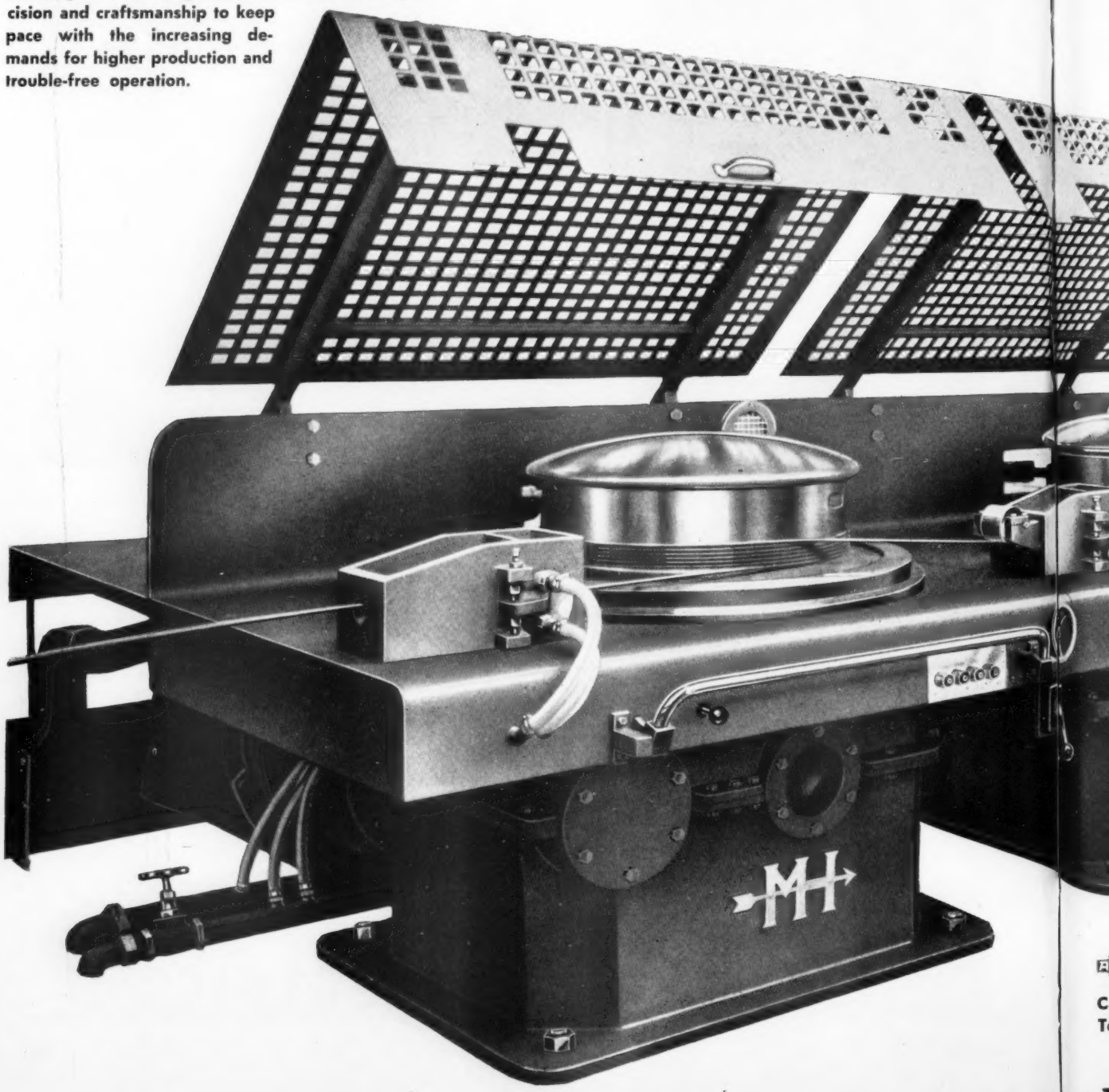
For more information on SE-9008, write: General Electric Company, Silicone Products Department, Section VV651, Waterford, New York.

GENERAL ELECTRIC

ARBOGA

THE BEELINE

Founded in 1856, AB Arboga Mekaniska Verstad — since 1943 a subsidiary of Morgardshammar — has for more than 60 years been designing and building wire drawing machines with Swedish precision and craftsmanship to keep pace with the increasing demands for higher production and trouble-free operation.



WIRE DRAWING MACHINES

WORLD WIDE

PRECISION WITH RUGGEDNESS

This BEELINE DG-5 — designed for manufacturing wire used in pre-stressed concrete fabrication — is a heavy-duty, straight-line, non-slip wire drawing machine that delivers high speed production with minimum maintenance.

It is delivered as a complete machine, job-tested and ready to go into operation with a minimum of labor and installation expense. Complete engineering and service facilities are readily available.

Write for your copy.

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ARBOGA, SWEDEN
Cable: VERKSTADEN, ARBOGA
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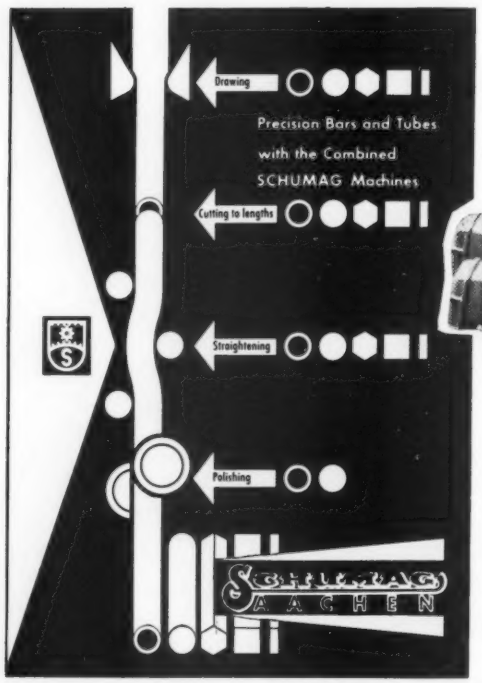
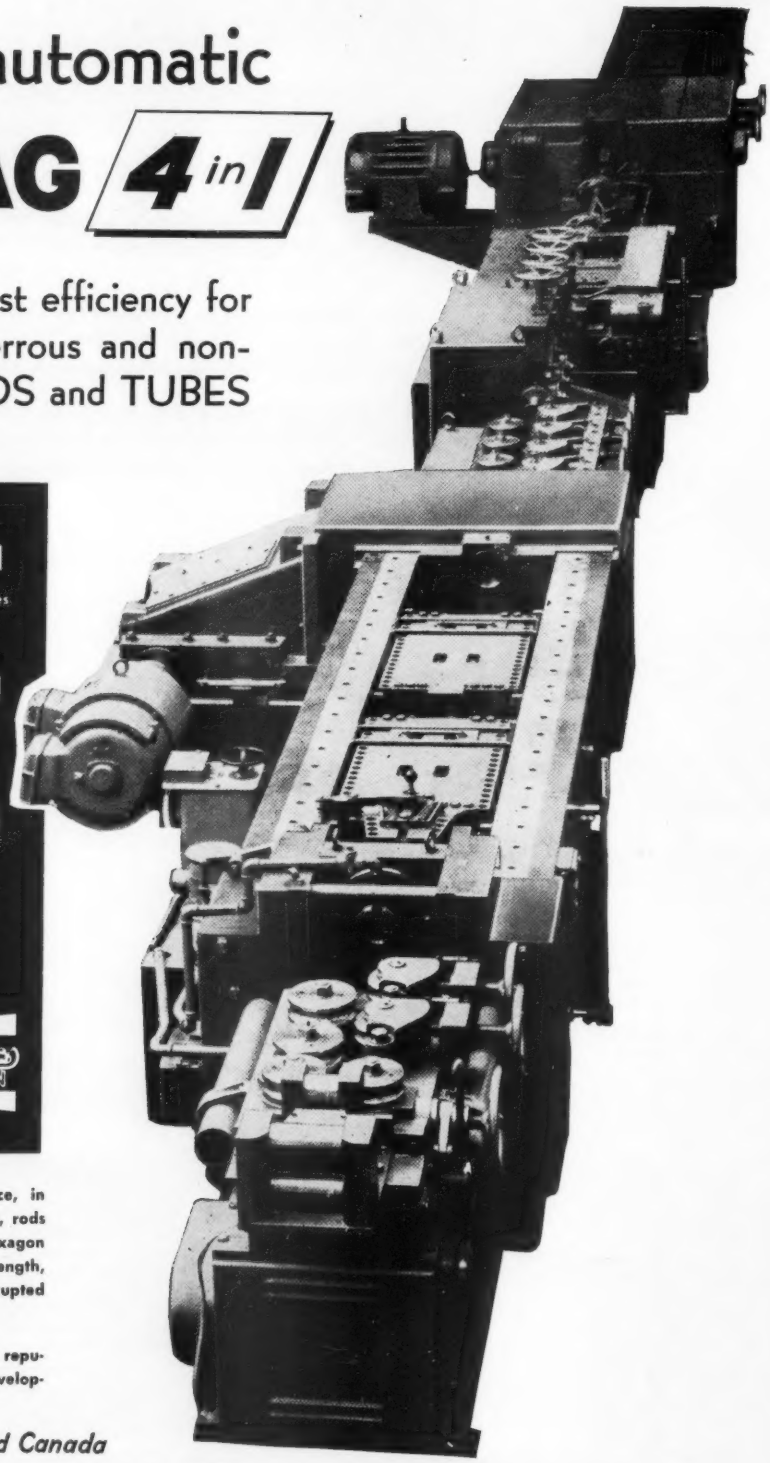
The fully automatic
SCHUMAG 4 in 1

ASSURES... greatest efficiency for manufacturers of Ferrous and non-Ferrous BARS, RODS and TUBES





- SCHUMAG "4 in 1" machines produce, in one continuous operation, finished bars, rods and tubes from round, square or hexagon material. They will finish draw, cut-to length, straighten and polish in one uninterrupted sequence.
- SCHUMAG "4 in 1" enjoys world-wide reputation as the ultimate in technical development.

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SCHUMAG AACHEN

Increase COLOR CODING OUTPUT

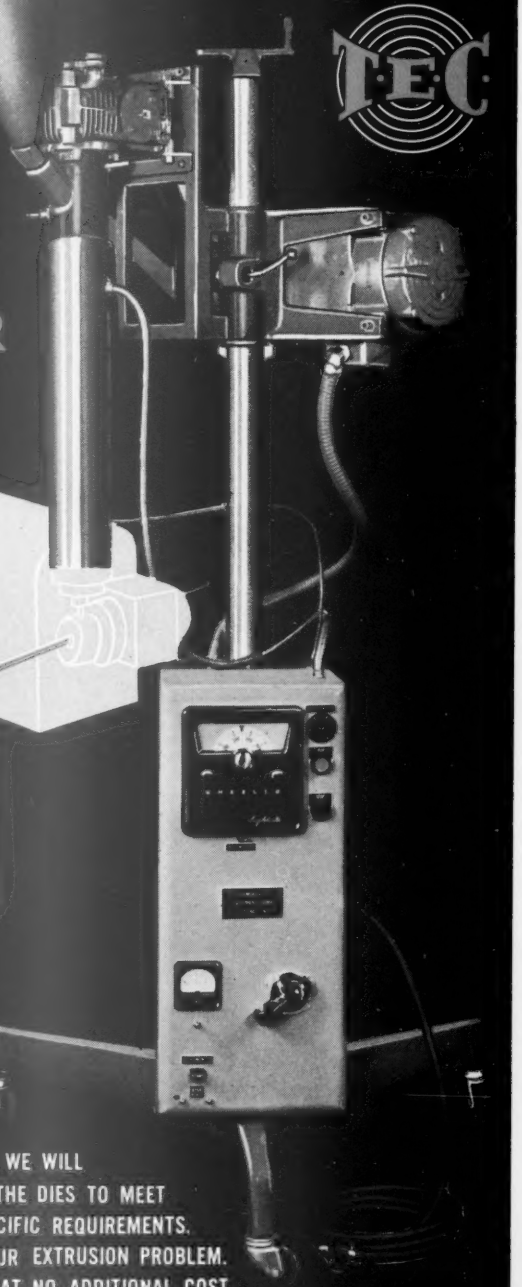
with the

Model 1250-20

LONG BARREL

VERTICAL EXTRUDER

T·E·C



Wire manufacturers with a coating problem will find the solution in this new vertical extruder.

This unit is complete and ready to run. It is designed to give you maximum versatility in operation. By means of a height adjustment and rotation of the top part, any setup job becomes routine.

The Model 1250-20 can be combined, in tandem, with any standard extruder in operations such as adding contrasting stripes or full color coating to insulation wire.

20:1 L/D Ratio
30-40 lbs./HR
Nominal Output

SIMULTANEOUS EXTRUSION OF DIFFERENT COLOR MATERIALS for:

- *Striping Indentification*
- *Color Coating*
- *Wire Insulation*

WE WILL MAKE THE DIES TO MEET YOUR SPECIFIC REQUIREMENTS. LET US KNOW YOUR EXTRUSION PROBLEM. WE WILL SOLVE IT AT NO ADDITIONAL COST.

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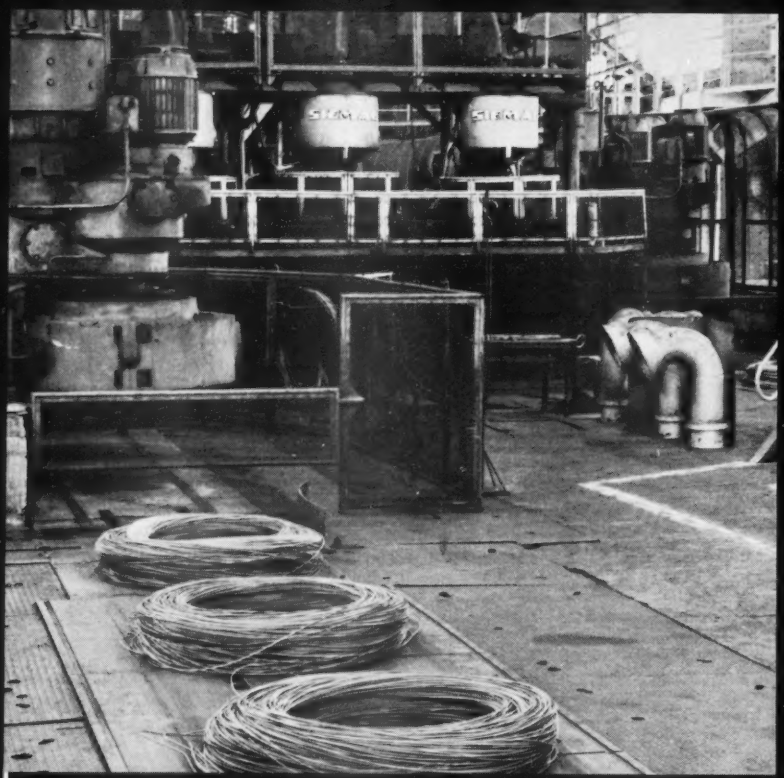
YAWATA STEEL. YAWATA STEEL



ACROSS THE SEAS TO WORLD MARKETS

Wire Rods of extremely high quality are produced by YAWATA for satisfied users throughout the world.

YAWATA, the biggest IRON and STEEL operation in the Far East, has the equipment and the knowhow to produce STEEL products of high quality and dependability.

When buying steel from JAPAN, specify YAWATA.

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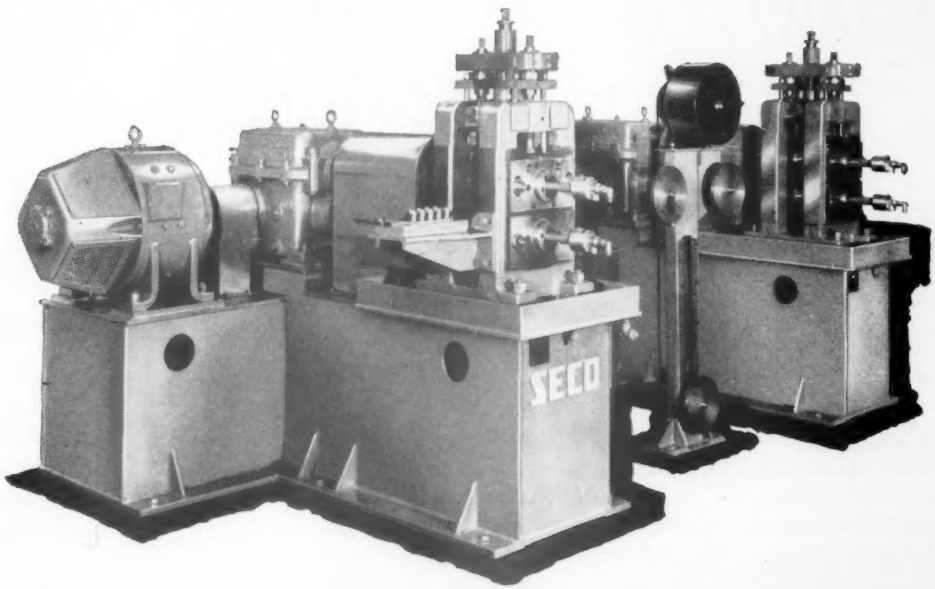
Predictable Performance

is yours when you change to

SECO WIRE FLATTENING MILLS



Acceptable and predictable performance "on both sides of the fence" when Seco Wire Flattening Mills are used in your operation.

Seco's staff of trained engineers . . . specialists in solving production problems . . . are available for personal assistance to you. Call us today.

SECO

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

STEEL EQUIPMENT COMPANY

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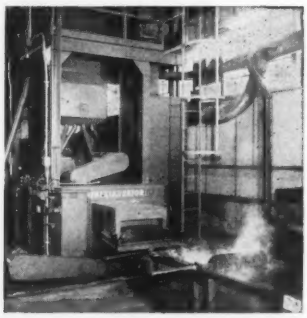
AFFILIATED WITH *Lee Wilson* ENGINEERING CO., INC.

Non-stop blast cleaning straightens out wire rod descaling

A demonstration of WHEELABRATOR'S

VITAL VALUES

Multiple strands of hot-rolled rod proceed through blast cleaning, patenting, and coating in one continuous straight line operation at Leschen Wire Rope Division of H. K. Porter Co., Inc. Wheelabrator mechanical blast descaling is the essential step that makes this automated processing possible. Floor space is reduced, pickling is eliminated, various surface finishes are possible and cleaning time is reduced, all of which add up to impressive cost savings. Wheelabrator's unequaled experience in blast descaling of wire is at your service. It is another of Wheelabrator's Vital Values that mean bigger savings for you.



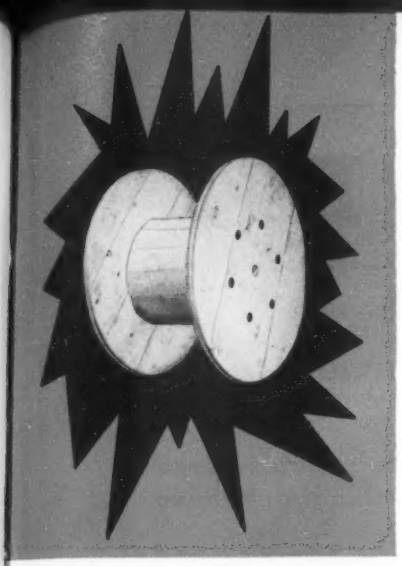
Wire rod can be straightened, blast cleaned, coated, drawn and cold headed in one continuous, straight-line operation. For full details, ask for Bulletin 148-D.

VITAL VALUES FOR INDUSTRY

WHEELABRATOR WIRE ROD DESCALING

WHEELABRATOR CORPORATION, 389 S. Byrkit St., Mishawaka, Indiana, In Canada, WHEELABRATOR CORPORATION OF CANADA, LTD. 1901 Birchmount Rd. P.O. Box 490, Scarborough, Ontario

A subsidiary of Bell Intercontinental Corp.



YOU SAVE WITH NON-RETURNABLES

BRIDGE REELS, through manufacturing techniques that have been continuously improved and streamlined, have become pre-eminently the standard for quality and dependability.

Look at these Advantages:

- Reduced Reel Investment
- Less Storage Space
- Lower Freight Costs
- No Return Freight Charges
- No Bookkeeping
- No Repair Costs
- No Deposits Needed
- No More Headaches! !

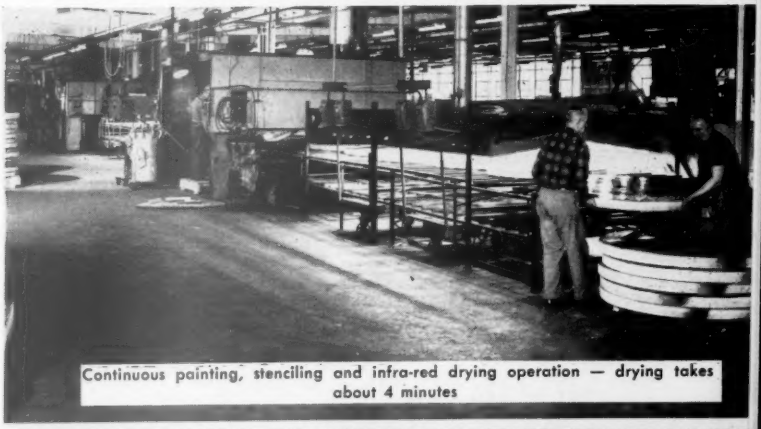
Start of production line for reel flanges.

Why BRIDGE REELS are Tops:

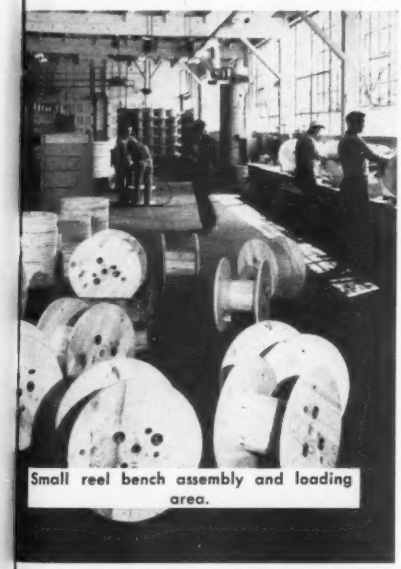
- Lumber Kiln Dried at Plant
- Latest and Finest Reel Manufacturing machines —many made to Bridge Special Specifications
- Fabricating methods continuously improved
- Fast, Efficient Straight-Line Flow of Production Work
- Painting and Stenciling Completed in approximately 4 Minutes
- Reel Assemblies made with many unique Mechanical Innovations
- Shipping and Delivery Facilities Unequaled

NON-RETURNABLE

WOOD REELS IN ALL SIZES FOR ALL TYPES OF ELECTRIC WIRE AND CABLE

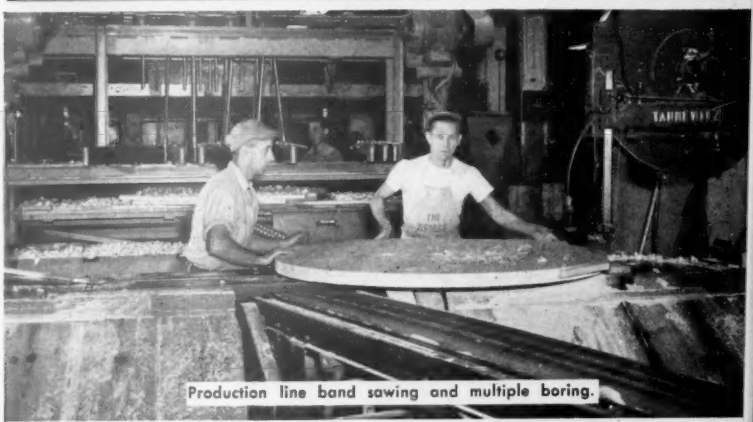


Continuous painting, stenciling and infra-red drying operation — drying takes about 4 minutes



Small reel bench assembly and loading area.

NON-RETURNABLE REELS GIVE YOU A DEFINITE PACKAGING COST



Production line band sawing and multiple boring.

"REEL" GOOD —

Let us quote on your Reel needs. Send in your specifications. Better yet, visit our plant and see how Reels are made so well at so low a cost.

WOOD REELS

HIGH-SPEED SHIPPING SERVICE IN OUR OWN TRUCKS WITHIN A RADIUS OF 250 MILES OF THE PLANT, FAST FREIGHT WILL BRING YOU BRIDGE REELS WITHIN A FEW DAYS TO POINTS EAST OF THE MISSISSIPPI.

TEL: THOMPSONVILLE, CONN.
Riverview 9-8308

METTLER

ANNOUNCES

THIS BRAND NEW

HIGH SPEED

SHUSTER

Model 1V18

⅛" CAPACITY

DOLLAR SAVER

COMPARE ! !

PRICE

PRODUCTION

and PROFIT

CAPACITIES 1V18

.062 to .125 basic wire

25 to 150 F.P.M.

Production:

Lengths up to 8"
200 pieces per minute

SINCE 1866

SHUSTER

Wire Straightening and Cut-off Machines and Components are built in 49 models from .020" to 11/16" Mettler Machine Tool also manufactures the SHUSTER 5/16" capacity. Thread Rolling Machines

SHUSTER

MODEL 1V18

WIRE STRAIGHTENING AND CUTTING MACHINE
VARIABLE SPEED ELECTRICALLY CONTROLLED

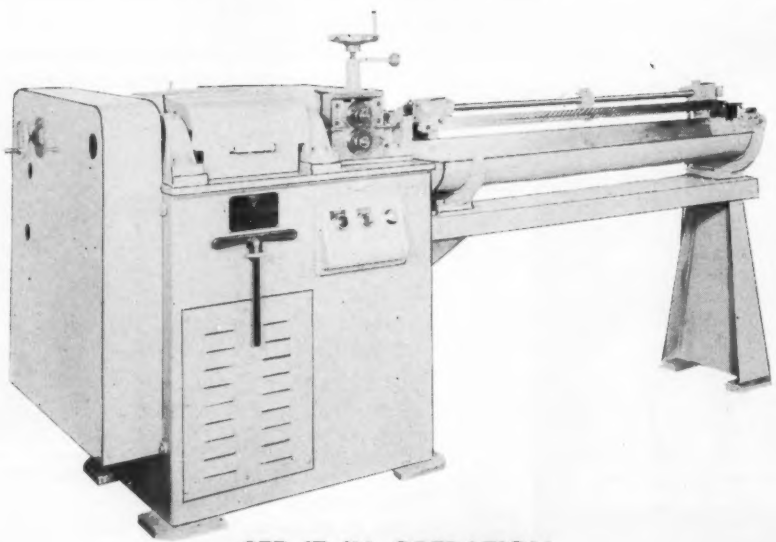
The Production Booster with infinite variable speed control and The New Electro Mechanical Positive Release Target

Illustrated is the new 1V18 SHUSTER AUTOMATIC WIRE STRAIGHTENING and CUT-OFF MACHINE. Many new features are included as Standard Equipment on these High Speed ⅛" capacity machines.

Features include: High Speed Straightening Arbor with elongated split dies for proper bearing surface and optimum straightening speed, new Shuster Electro-mechanical positive release target, with electrically controlled tripping mechanism to instantaneously operate roll type clutch. Feed roll housing and fly wheel are Timken bearing equipped. All mechanisms are mounted on Shuster Welded Steel Base. Also included are new improved Guide Bar, Guide Bar Cover and a new Angled Control Panel together with properly engineered working height.

There are more SHUSTERS in use throughout the world than all other machines of its type.

200 CUTS PER MINUTE



SEE IT IN OPERATION
AT THE CHICAGO WIRE CONVENTION

METTLER MACHINE TOOL, INC.

Boulevard Industrial Park
New Haven, Conn.

... Results of a Superior Beginning

The countless parts and products made from Roebling high-carbon steel spring wire and flat spring steel have one thing in common . . . their superior quality. This, of course, is related to the inherent fineness of the materials.

The variety in which Roebling offers these spring materials is equally impressive. They are available in hard drawn, hard rolled, annealed or soft, tempered or untempered. Types include zigzag and no-sag wires; upholstery and mechanical spring wires; valve spring wire; clock- and motor-type spring steels and flat spring steels of all types and description.

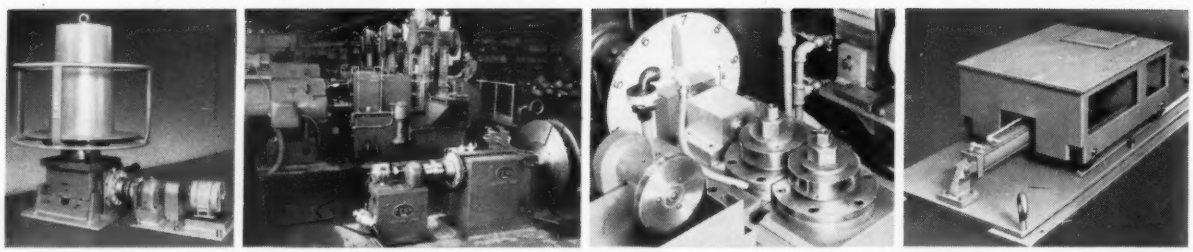
Whatever the type, size or characteristics you require — Roebling can fit your needs exactly. You'll find that Roebling quality means maximum production from your machines and consistent uniformity in your product.

For spring wire and flat spring steel information, contact Roebling's, Wire and Cold Rolled Steel Products Division, Trenton 2, New Jersey.

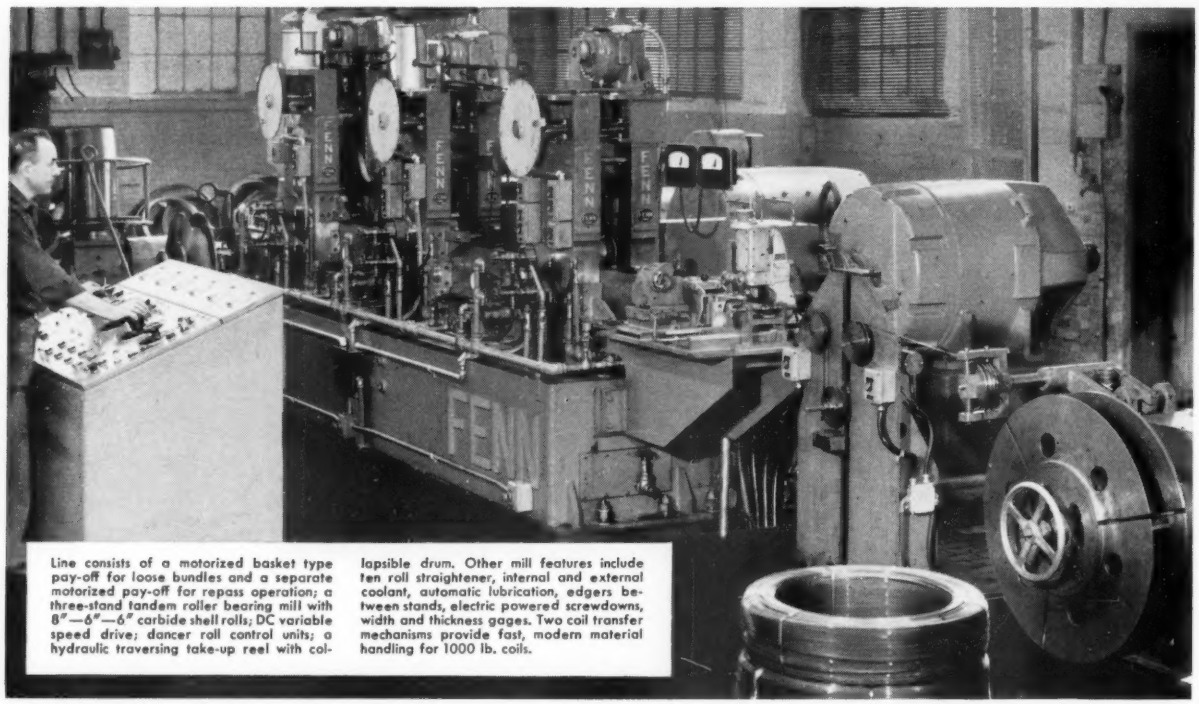
ROEBLING

Branch Offices in Principal Cities
John A. Roebling's Sons Division • The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it



PRODUCING SPRING STEEL FLATS AT 3100 FPM



Line consists of a motorized basket type pay-off for loose bundles and a separate motorized pay-off for repass operation; a three-stand tandem roller bearing mill with 8"—6"—6" carbide shell rolls; DC variable speed drive; dancer roll control units; a hydraulic traversing take-up reel with collapsible drum. Other mill features include ten roll straightener, internal and external coolant, automatic lubrication, edgers between stands, electric powered screwdowns, width and thickness gages. Two coil transfer mechanisms provide fast, modern material handling for 1000 lb. coils.

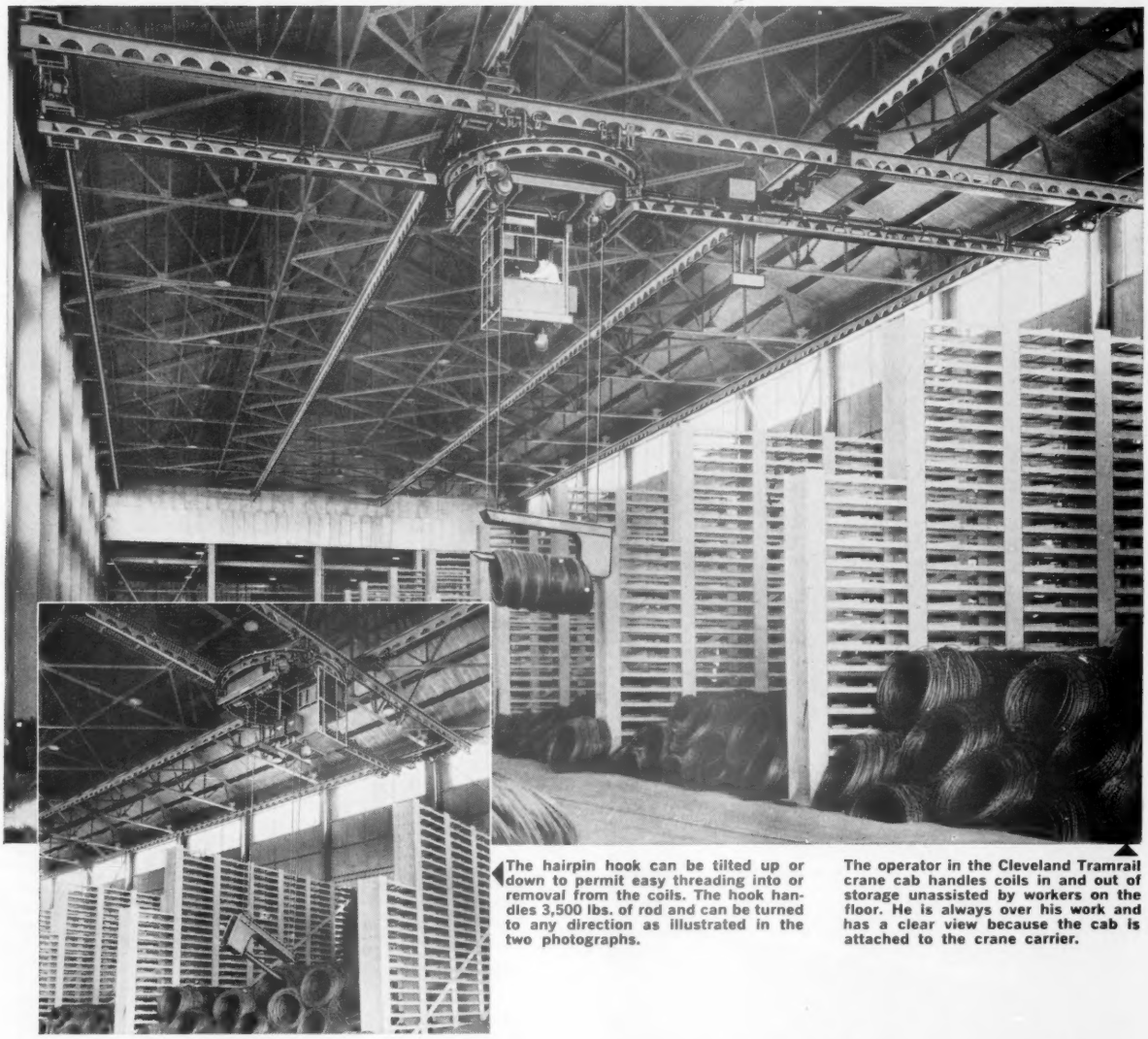
pace-setting precision wire flattening mill

This three-stand tandem mill represents the finest in high speed precision wire flattening equipment. Installed at one of the nation's largest producers of spring steel, it offers significant advantages in flexibility, customer service, and finer stock finish. Production is greatly simplified with special material handling accessories, and the ability to produce flats from starting rounds entirely eliminates the customary slitting operation. Perhaps, like this progressive manufacturer, the time is at hand to evaluate your wire flattening equipment in terms of the economic justification for modernizing to the standards set by Fenn mills. Fenn's long experience is at your service. Fenn engineers will study your specific requirements and make recommendations for equipment to your competitive needs. The Fenn Manufacturing Company, Fenn Road, Newington, Connecticut.

Designed and Built by FENN

Crane with ROTATING CARRIER

Provides Ultimate In Wire and Rod Handling Efficiency



The hairpin hook can be tilted up or down to permit easy threading into or removal from the coils. The hook handles 3,500 lbs. of rod and can be turned to any direction as illustrated in the two photographs.

The operator in the Cleveland Tramrail crane cab handles coils in and out of storage unassisted by workers on the floor. He is always over his work and has a clear view because the cab is attached to the crane carrier.

Five motions: hoisting, tilting, trolley travel, bridge travel and rotation are provided in a Cleveland Tramrail crane for handling coiled rod. The trolley travels on a 76-foot double-girder crane bridge from side to side of a building. A rotating carrier operates on a circular track built into the trolley. It turns unlimitedly in either direction. The crane travels on four runway tracks and is controlled from a cab which is attached to the carrier.

Coiled rod is picked up from incoming railroad cars by a hairpin-type hook and turned 90 degrees for placement into large bins along one side of the storage building. The hook can be tilted either up or down for threading into or drawing away from the coils.

The unit handles 3,500 lbs. of rod in addition to the weight of the hairpin hook. Bridge and trolley control are variable five-speed magnetic with dynamic braking. Hoist control is variable-speed drum type with dynamic lowering. Rotating control is automatic accelerating.

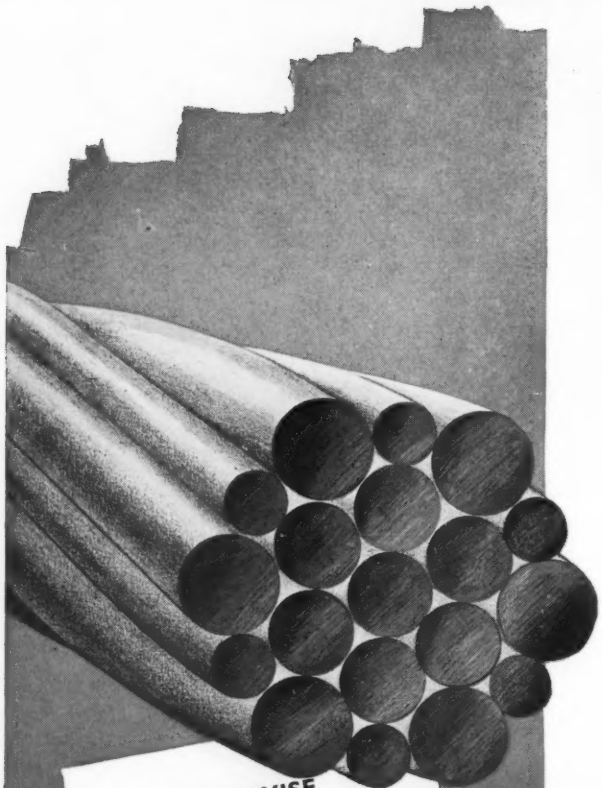
With a wealth of experience to draw on, Cleveland Tramrail engineers are in position to help you with a wide range of materials handling problems. We welcome an opportunity to work with you.

Write for free booklet No. 2008

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 9230 E. 288 ST. • WICKLIFFE, OHIO



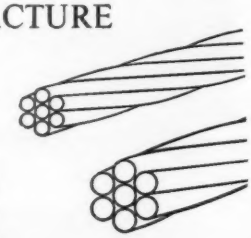
WE CAN ADVISE
ON THE AVAILABILITY
OF JACKS AND GRIPS
FOR LARGE STRANDS

LARGE STRANDS for prestressed concrete

❀ ❀ ❀

WE ALSO MANUFACTURE

SMALL STRANDS



and plain, indented or crimped wires

RYLANDS

Brothers Limited

WARRINGTON
ENGLAND

ROYLE
Paterson, N. J.

VECTOR CV*

by ROYLE

Offers cost advantages to producers of High Voltage Power Cable

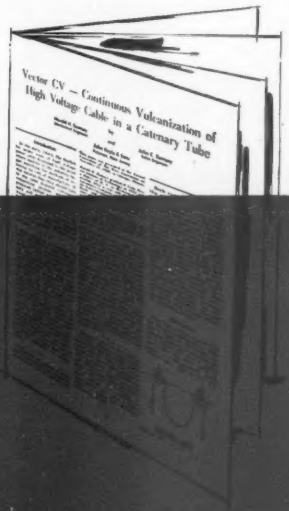
Vector CV incorporates the good features of both horizontal and vertical CV systems without the limitations of either . . . limitations of cable size or height of building.

Since Vector CV utilizes the catenary curve — the only curve a cable can assume when freely supported at two points not in the same vertical plane — deformation and scuffing of the cable's outer jacket is eliminated, which tension alone cannot do.

Also a catenary curve can be adapted to any building and any size wire can be run in that curve. There is no need to build 7 or 8 story buildings in order to vulcanize large diameter cables.

Because Vector CVs are ordinarily planned with 200 feet of steam tube, the average rate of productivity is 300% higher than a vertical CV installation with a vulcanizing tube 65-70 feet high.

In short — in initial installation costs, in speed of productivity and in versatility of cable size capacities, Vector CV by Royle offers cost advantages which should be carefully investigated by every producer of High Voltage Power Cable.



JOHN ROYLE & SONS

Pioneered the Continuous Extrusion Process in 1880

Home Office, V. M. Hovey, J. W. VanRiper, SHerwood 2-8262. **Akron, Ohio,** J. C. Clinefelter Co., BLackstone 3-9222. **Downey, Cal.,** H. M. Royal, Inc., TOpaz 1-0371. **London, England,** James Day (Machinery) Ltd., Hyde Park 2430-0456. **Tokyo, Japan,** Okura Trading Company, Ltd., (56) 2130-2149.

JOHN ROYLE & SONS, 10 Essex Street, Paterson 3, New Jersey

Please send me, without obligation, a copy of the Vector CV reprint.

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ ZONE _____ STATE _____

Why more and more wire producers are increasing profits by switching to Molysulfide® Lubricants

The ever increasing profit squeeze on wire producers during the past five years, has spotlighted the value of Molysulfide for more efficient and higher speed wire drawing. Ferrous and non-ferrous producers have reduced wire breakage, increased die life, run more wire and, at the same time, increased the quality of their products.

The reason: Molysulfide has an extremely low coefficient of friction, the lowest of any known solid lubricant. Molysulfide forms a protective film around the wire — a film stronger than the yield point of most metals. As a result, you prevent scratching and seizing, get fewer rejects, less breakage and longer runs with less downtime. At the same time, die life is increased because minute portions of Molysulfide stay on the dies.

- **High carbon wire** — By using Molysulfide lubricants, a large steel company has increased wire-drawing speeds several hundred feet per minute. In some cases they doubled the previous drawing speeds.

- **Aluminum core wire** — Tests conducted on a 0.70 carbon steel for aluminum core wire, through a five-hole Vaughn running lime-coated rod, increased drawing speeds from 800 fpm to 1500 fpm. During the trial run, 20 bundles of wire were drawn with only 0.0002 wear on the finishing die.

- **Nuclear type wire** — Drawing results "improved immeasurably" on tough nuclear, reactive and refractory type metals.

- **Wire rope** — A molybdenum disulfide-bearing metallic soap, used in drawing wire for wire rope, increased wire-rope wear, life and toughness. Fatigue tests and field tests showed superiority ranging from 23 to 40% over other wire ropes.

- **Copper wire** — Before Molysulfide wire drawing lubricants were used, dies began failing after an average of three spools. Now an average of 60 spools (approximately 15,000 lbs.) can be drawn without die damage. Drawing speed has increased from 1,200 fpm to 2,000 fpm.

Can you break through your profit squeeze solely by using a wire-drawing lubricant containing Molysulfide? It's more than likely. And it's certainly an inexpensive possible means of increasing your wire-drawing efficiency — and your profit too.

For information about wire-drawing lubricants containing Molysulfide write to us; the Climax Molybdenum Company Division of American Metal Climax, Inc., 1270 Avenue of the Americas, New York 20, N.Y.

CLIMAX MOLYBDENUM

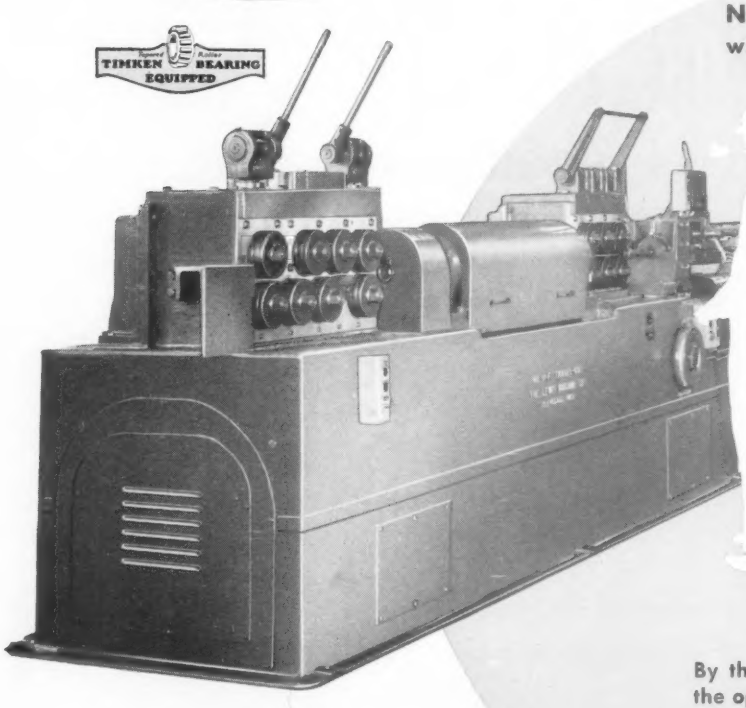
CLIMAX MOLYBDENUM COMPANY

a division of AMERICAN METAL CLIMAX, INC.

1270 Avenue of the Americas, New York 20, N.Y.

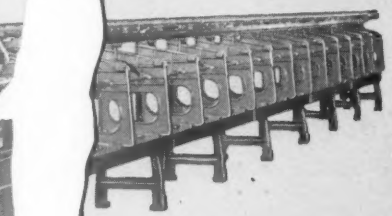
LEWIS

Machines can solve any wire straightening or cutting problems



No. 11-F TRAVEL-CUT
with special extension

This machine was engineered to meet special requirements for custom cutting a wide variety of concrete reinforcing bars up to 50 feet in length



SINGLE STATION OPERATION

eliminates waste time and fatigue by placing operator at one position

By the simple movement of a lever the operator can set the electric limit switch to cut any desired length from 6 to 50 feet. A dial graduated in feet and inches tells him the exact length the machine will cut. A preset counting device stops the machine when the proper number of pieces is cut.

Any predetermined number of pieces may be cut with this equipment to any predetermined length without the operator moving from his regular position at the machine.

There is a Lewis Machine design to straighten and cut all materials and shapes in wire and or bar stock from .012″ to 1″ diameter at a wide range of speeds. If you have a wire straightening and cutting problem, or special requirements for a job, ask us for information and suggestions about how Lewis Machines can increase your production, control your quality and greatly reduce your costs.

New illustrated brochure available on request.

THE LEWIS MACHINE COMPANY

3441 East 76th Street • Cleveland 27, Ohio, U.S.A.

Preliminary Announcement Of
The West Coast Regional Meeting
of
THE WIRE ASSOCIATION

June 22-23, 1961, Jack Tar Hotel, San Francisco, Cal.

PROGRAM SCHEDULE

Thursday, June 22

10:00 A.M. — Registration.

2:00-5:00 P.M. — Technical Session. Six papers will be presented, each on a timely subject.

Friday, June 23

9:30 A.M. — Plant Inspection Trip. Busses leave the hotel for a visit to the South San Francisco Mill of Bethlehem Steel Corp. Particular emphasis will be placed on the Bolt Department.

Luncheon will be served at the International Inn.

The return trip will be made via the Scenic Coast route for the enjoyment of the group.

6:30-7:30 P.M. — Hospitality Hour. This will be sponsored by Bethlehem Steel Corp., The Colorado Fuel & Iron Corp., Columbia-Geneva Steel Div. of U. S. Steel Corp., Planett Mfg. Co., John A. Roebling's Sons Div. of C.F.&I., and Wire Specialties Co.

7:30 P.M. — Dinner. Door prizes will be distributed and a top-notch after-dinner speaker will address the gathering. Ladies are invited.

This meeting gives every promise of upholding the traditional hospitality and interest of our West Coast Regional Meetings.

All wire men are cordially invited to be present for the full schedule of events. Make your plans now to be in San Francisco on the 22nd and 23rd of June.

Registration fee, $15.00, includes all costs, except for hotel room.

THE WIRE ASSOCIATION

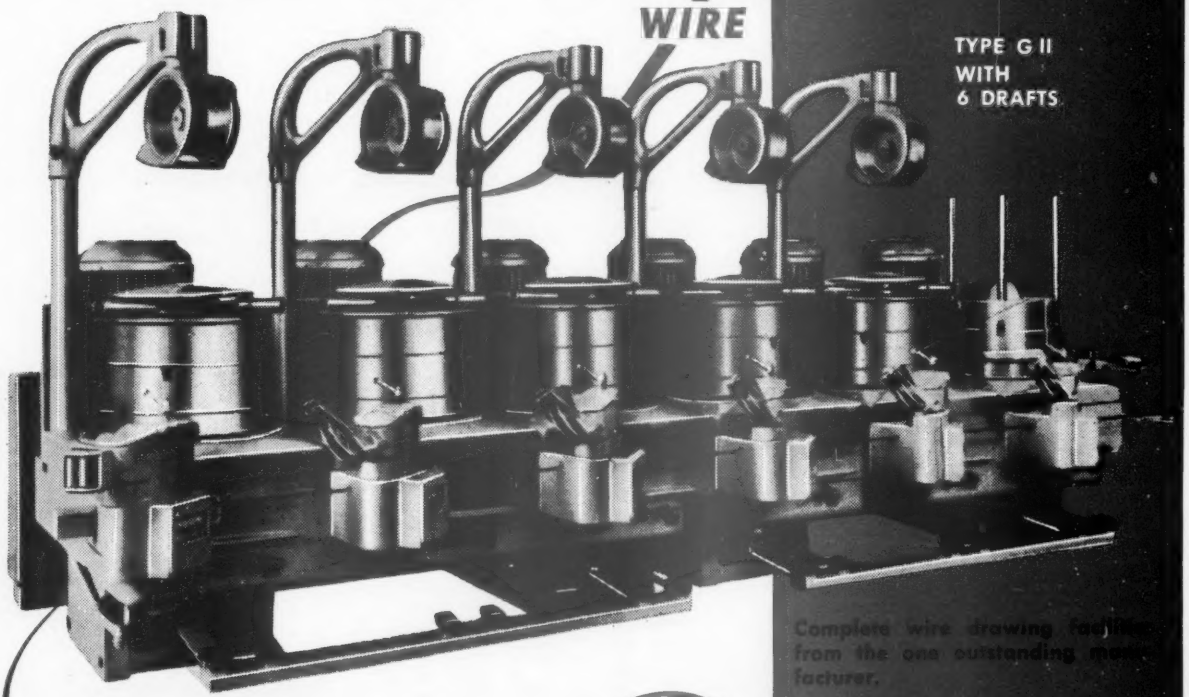
Richard E. Brown, Executive Secretary

453 Main St. **Stamford, Conn.**

HERBORN

WIRE DRAWING MACHINES

NON-SLIP MULTIPLE OPERATION FOR BASIC and CARBON STEEL WIRE



TYPE G II WITH 6 DRAFTS

This is the Herborn Type G II non-slip multiple wire drawing machine with 5 drawing blocks 18" diameter and a finishing block of 20" or 24" diameter.

- *Each block has individual motor and drive with 2, 3 or 6 speeds.*
- *Water-cooled system, for blocks and die holders*
- *Precision ground helical teeth gears for smooth running.*
- *Smooth, slow-starting arrangement over a transformer.*
- *Emergency stop system, plus other safety features.*
- *The machine can be constructed as six separate, individual units which can be operated as single blocks, or in tandem as a 6 block unit.*

Complete wire drawing facilities from the one outstanding manufacturer.

Economical Operation—More plus features than any other machine at twice the price.

Pay for themselves quickly through increased production, elimination of downtime, and superior products at lower cost.

For complete information, write to:

HERBORN MACHINERY CORP.

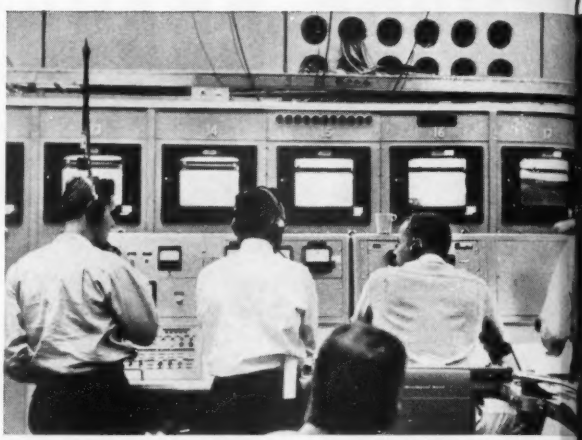
61 HUDSON STREET, HACKENSACK, NEW JERSEY

Maschinenfabrik Herborn - Berkenhoff & Drebes A.-G.

Herborn/Dillkreis (Germany)

ARE YOU PUTTING TODAY'S NEW P

Signal Corps



Missile Control

Tree Wire

Telephone Wire

HI-FAX®

Hi-fax pioneered the use of high-density polyethylene in wire and cable coatings. It is now the standard by which other such materials are measured, still acknowledged as by far the best. Only Hi-fax provides high molecular weight with an excellent combination of the physical properties most important in insulation materials, including abrasion and cut-through resistance, and resistance to heat crack.

Hi-fax is the only high-density polyethylene specifically designed for extrusion. Result: high production rates, good gauge tolerances, and freedom from pinholing. They add up to good reasons why you should explore Hi-fax in your own product applications.

Whenever high-density polyethylene can provide the answer to your insulation requirements, *specify Hi-fax*. You'll be in good company: Hi-fax has served longer . . . and is now used in greater volume than any other high density polyethylene employed for insulation.

HERCULES

THE MOST EXPERIENCED AND RELIABLE SOURCE

OF MODERN POLYOLEFINS FOR INSULATION

EW POLYOLEFINS TO THEIR BEST USE?

Pro-fax insulation only 3 mils thick withstands vulcanization of rubber jacket.

Does your insulation problem require a new approach to solve special needs? Very often Pro-fax polypropylene can provide the answer. This new plastic has properties unmatched by other insulating materials. With a high melting point and excellent cut-through resistance, Pro-fax can be covered with a vulcanized rubber jacket. Its excellent combination of electrical and mechanical properties makes it ideally suited for insulations requiring resistance to mechanical abuse. Among the many interesting developments in Pro-fax insulation are expanded or foamed coatings . . . lightweight, easy to apply, and low in cost.

Hercules, the world's largest producer of high-density polyethylene and polypropylene, offers you the most experienced and reliable source of modern polyolefins for insulation. For further information, call or write:

Cellulose Products Department
HERCULES POWDER COMPANY INCORPORATED
Hercules Tower, Wilmington 99, Delaware

CP61-5

Quality plus economy when you buy SUMITOMO steel wire rods

Rapid developments in the wire-product field have increased industry's demand for top-quality steel wire rods. Because of its international reputation for reliability, Sumitomo Metal supplies world markets — America in particular — with 7,000 tons of wire rods every month. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.

Dimensions of Sumitomo Wire Rods

Diameter 5mm. (13/64″) — 16mm. (5/8″)
Weight Single Bundle
about 270 kgs. — 320 kgs.
600 lbs. — 700 lbs.
Compressed Bundle (6 coils)
about 1,620 kgs. — 1,920 kgs.
3,600 lbs. — 4,200 lbs.
Coil Dimensions on Request

LEADING PRODUCERS OF STEEL WIRE RODS, PIPE AND ROLLING STOCK PARTS

SUMITOMO METAL INDUSTRIES, LTD.

Head Office: Osaka, Japan
Cable Address: "SUMITOMOMETAL OSAKA"

New York Office: 420 Lexington Ave., New York 17, N.Y.
Cable Address: "SUMITMETAL NEWYORK"

This is the End-result and NATURAL SOLUTION to the problem of BETTER PACKAGING

...and the entire Industry had a hand in it!

★ LARGER PACKAGES ★ FASTER DELIVERY OF WIRE
★ ELIMINATION OF CUSTOMER COMPLAINTS

ACROMETAL'S new LONG TRAVERSE REELS

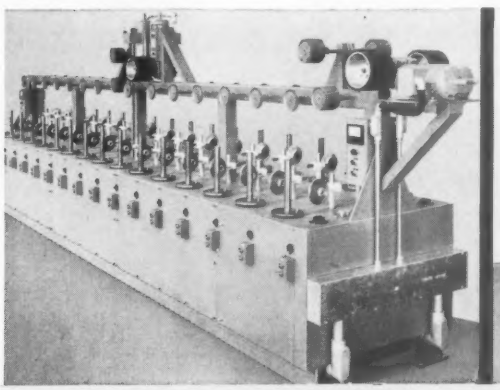
—more pounds per unit—at greater speeds —with less grief and trouble.

With this long traverse disposable reel, you can de-reel wire over the head at a higher rate of speed than you can do it from the currently used pail pack—and at the same time eliminate snags, knots and down-time.

Packages 120 lbs. of wire to reduce your unit costs. Handles complete range of wires from #12 to #34 AWG, ferrous and non ferrous. Designed with 10" top flange and 11" bottom flange for easy de-reeling over the head. 12½" traverse, 6½" barrel and 1⅛" or 1½" arbor hole. Smooth lap-welded seam on barrel assures maximum strength and rigidity under pressure. Your packages of wire can then be shipped individually in fiber pails or in bulk on pallets.

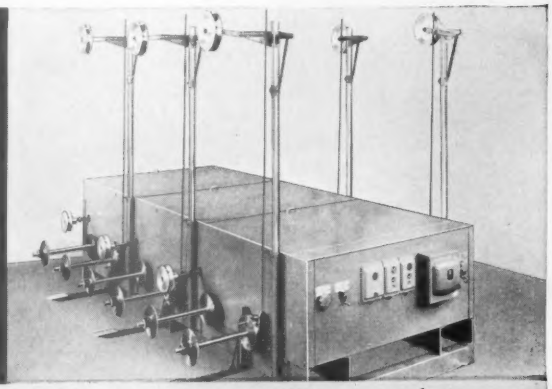
This long traverse reel is the answer to service problems that have plagued the wire industry for five years. We predict it will become the standard de-reeling process of the future. Smaller sizes available for fine wire.

THESE ARE THE ELEMENTS of the packaging process everyone dreamed about five years ago—but only recently came into focus. They are the natural evolution and development from experiments and testing in which the entire Industry had a part. Give this a long hard look. We are convinced that in this direction lies the answer to larger packages, greater speeds and the elimination of costly consumer trouble.



VERTICAL SPINDLE SPOOL TAKE-UP

This 32 spindle machine for volume production will handle all sizes of spools up to 12" flange diameter and 13" maximum traverse. Employs variable speed capstan drive. Universal variable traverse drive is easily adjusted for varying wire diameter. Can be used in tandem with strand annealers or enameling systems. Individual torque motor drive for each spindle controlled by master power stat or individual trimmers for varying torque tension. Extra attachment available for traverse drive to accommodate winding taper on straight barrel spool.



6-HEAD RE-SPOOLER to handle long traverse reels for bigger packages of heavy wire at high speeds

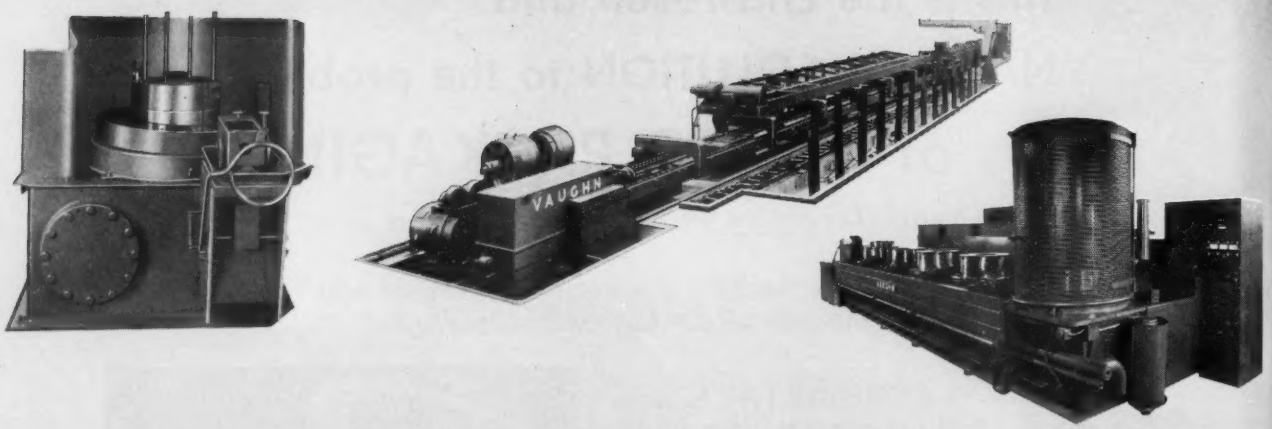
Three heads on each side take reels up to 12" flange diameter with a 13" traverse. Packages 120 lbs. of wire to reduce your unit cost and require less handling. Variable speed motor drives, 3 to 1 ratio, with speeds up to 1500 feet per minute. Individual foot operated mechanical clutch on each spindle. Adjustable brake tension control. Can be furnished with outboard bearing supports if desired. (Re-Spoolers for larger reels also available.)

NOTE: All Vertical Spindle Take-Ups and High-speed Re-Spoolers can be provided with an attachment to build tapered windings on the Long Traverse Reel if so desired.

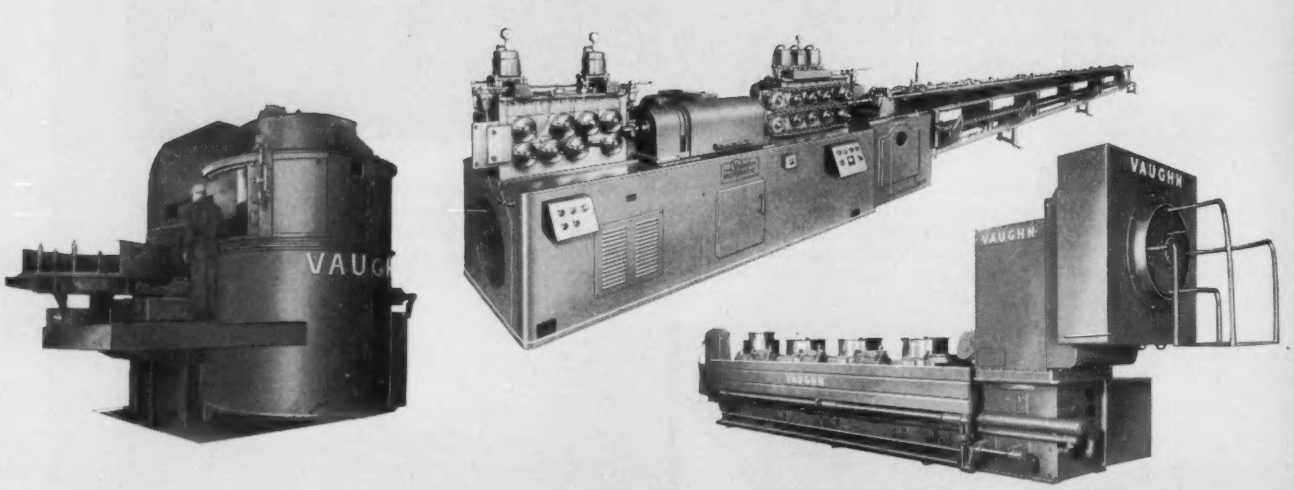
Call us for further details

ACROMETAL PRODUCTS, INC. 616 N. 5th St., Minneapolis 1, Minn.

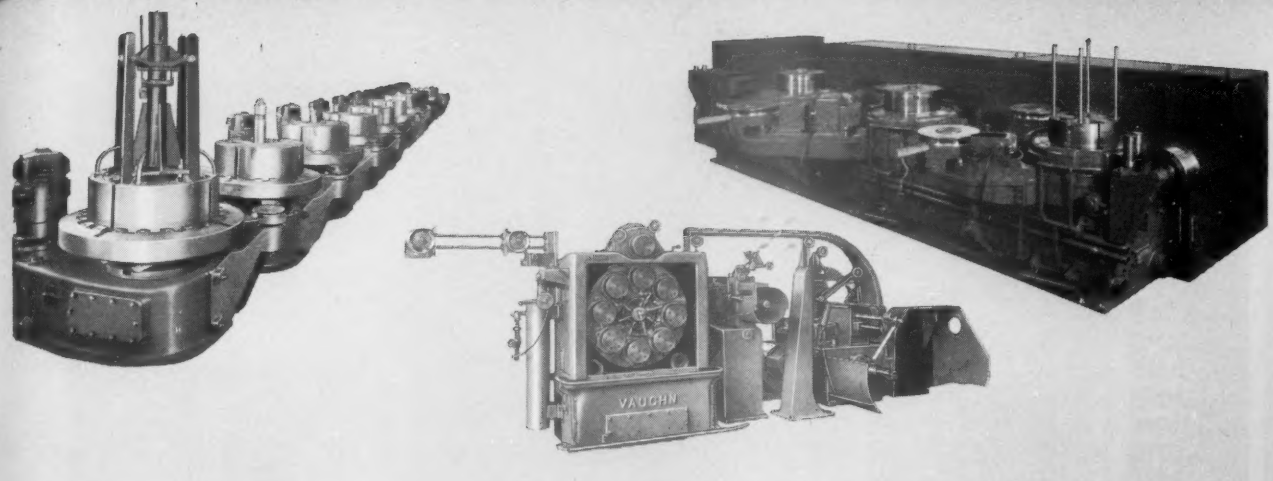
Everything you need for Packaging wire



IF IT'S COLD DRAWN



The World's Most COMPLETE LINE of Cold Drawing Equipment ... for the Largest Bars and Tubes ... for the Smallest Wire ... Ferrous, Non-Ferrous Materials or their Alloys.



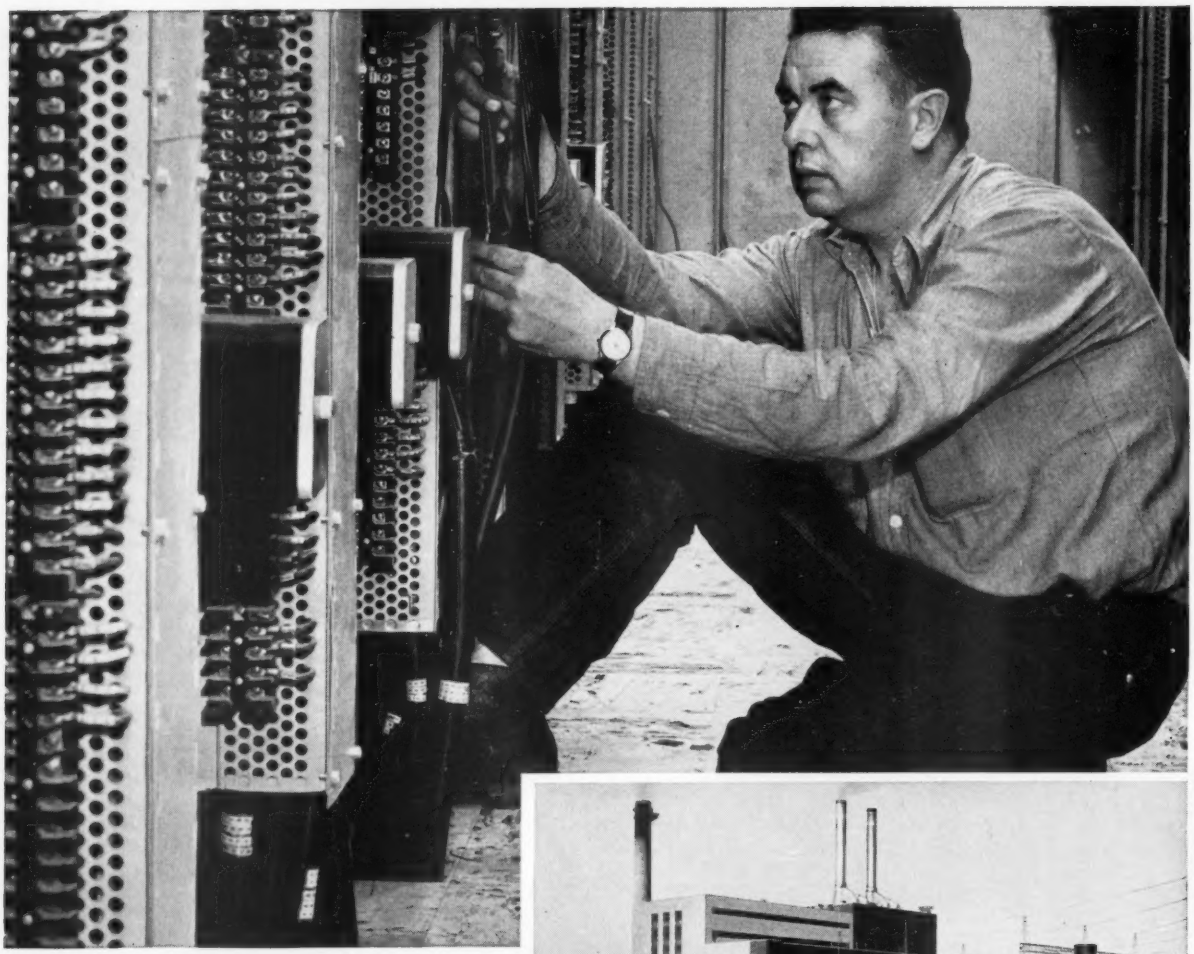
...SEE VAUGHN!

"Quick on the Draw!"

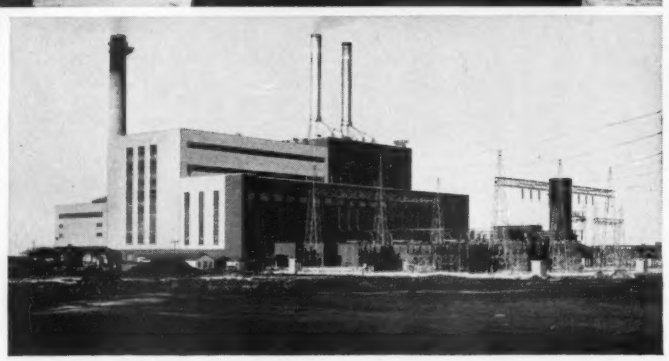
When cold drawing is part of your production picture, come to the leading equipment manufacturer for every service you may require . . . consultation, design, layout, quotations . . . and the broadest choice of cold drawing and related machinery in the world. You'll find Vaughn co-operation as complete as our resources. Let us serve you!

THE VAUGHN MACHINERY COMPANY

CUYAHOGA FALLS, OHIO, U. S. A.



Electrician at rear of main control board installing 7-conductor control cable insulated with BAKELITE polyethylene. All of the control cable for this installation was supplied by the Rome Cable Division of Alcoa, Rome, N.Y.



The recently expanded Dunkirk Steam Station where remote-control operation depends on perfect cable performance.

CONTROL CABLES INSULATED WITH BAKELITE® POLYETHYLENE

now in 11th year of operation at Niagara Mohawk Steam Station

In January 1951, the Niagara Mohawk Power Corporation completed their modern steam plant at Dunkirk, N.Y. Insulation of BAKELITE Brand polyethylene was used for the thousands of feet of multi-conductor control cable to *assure maximum service life under all operating conditions.* When the two new 200,000 kilowatt units were recently added, control cable insulated with BAKELITE polyethylene was again installed.

According to a Niagara Mohawk Engineering Department memo, "The excellent electrical characteristics and the attractive economies involved have led us to the use of polyethylene insulated control cables almost exclusively for our generating stations for recent years."

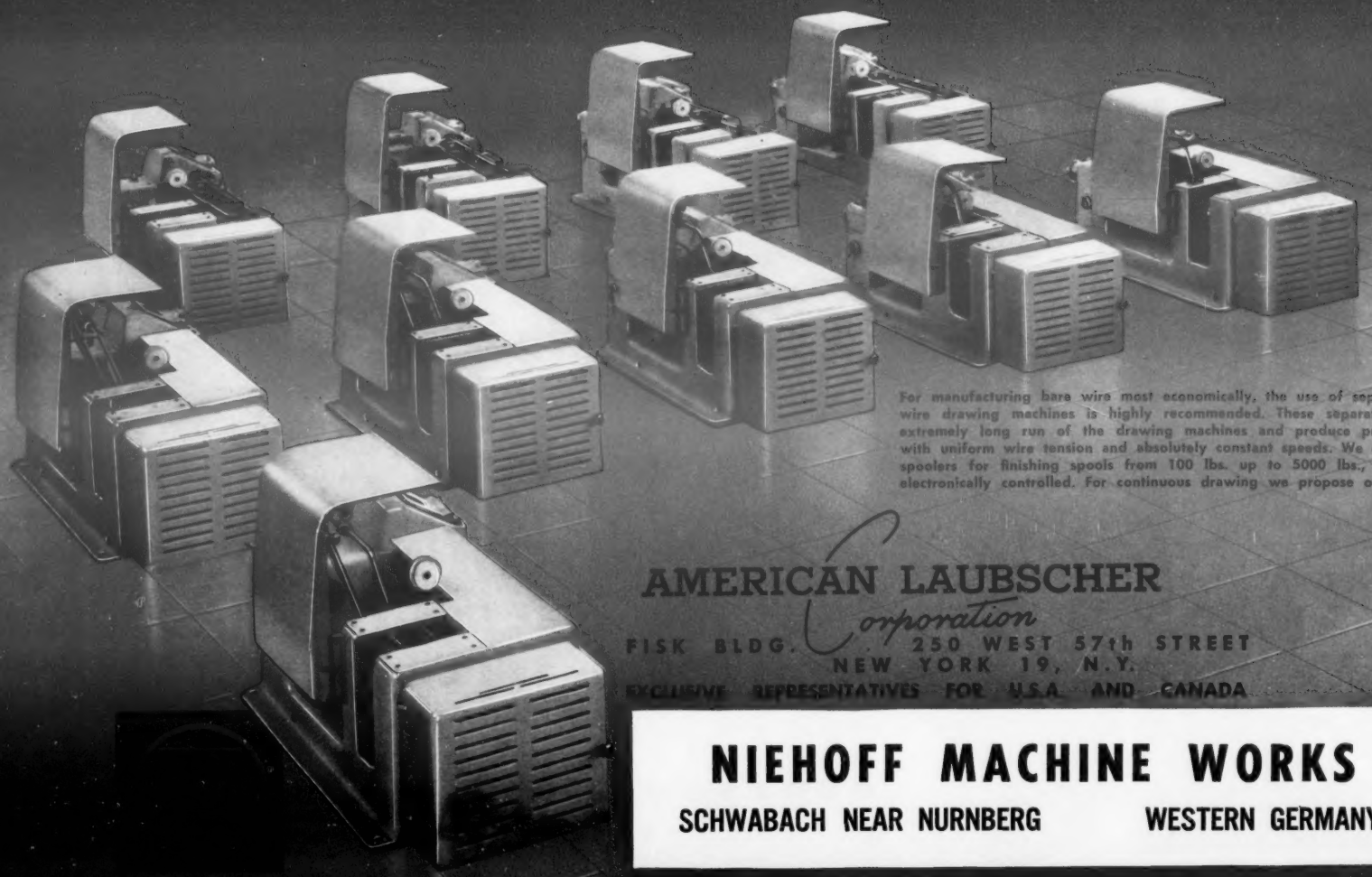
More and more utilities are finding out that control and power distribution cables insulated with BAKELITE polyethylene meet their rigid long-life requirements . . . even under the most severe conditions. Besides exhibiting excellent low-loss electrical characteristics, quality polyethylene is tough, durable and flexible, unaffected by low temperatures, and highly resistant to moisture, chemicals, cracking and deformation at operating temperatures.

For detailed information on BAKELITE polyethylene for jacketing or insulation, write Dept. JY-160F, Union Carbide Plastics Company, Division of Union Carbide Corporation, 270 Park Ave., New York 17, N.Y. *In Canada*: Union Carbide Canada Limited, Toronto 12.

UNION CARBIDE

BAKELITE and UNION CARBIDE are registered trade marks of Union Carbide Corporation.

NEW DEVELOPMENTS CONTINUE!



For manufacturing bare wire most economically, the use of separate spoolers behind wire drawing machines is highly recommended. These separate spoolers assure an extremely long run of the drawing machines and produce perfect finishing spools with uniform wire tension and absolutely constant speeds. We offer a wide range of spoolers for finishing spools from 100 lbs. up to 5000 lbs., AC or DC driven or electronically controlled. For continuous drawing we propose our double spoolers.

AMERICAN LAUBSCHER *Corporation*

FISK BLDG. 250 WEST 57th STREET
NEW YORK 19, N.Y.

EXCLUSIVE REPRESENTATIVES FOR U.S.A. AND CANADA

NIEHOFF MACHINE WORKS

SCHWABACH NEAR NURNBERG WESTERN GERMANY

MODERNIZE YOUR PREHEATING PROCESS WITH A

WALCO All Electric WIRE PREHEATER

Patent #2931891
and other patents pending

Now 3 MODELS

For copper or aluminum wire sizes #24 to #0, depending upon temperature and speeds required.

- Continuous wire pre-heating
- Uniform heat • Compact
- Portable • Easy to install
- Increases Production
- Temperature control
- Indicating Gauge
- Positive heat control at any given speed
- Non-Oxidizing • Infinite heat range with Safety of operation
- Synchronizes with other equipment. No spoilage
- Inexpensive to operate
- No fire hazard
- Minimum maintenance
- Rotating parts equipped with heavy duty ball bearings
- Eliminates temperature guess work
- Eliminates constant flame vigilance
- Eliminates hazardous gas lines
- Adjustable to line up with all make and size extruder heads
- Automatic "On" and "Off" operation

MODELS: W-7½ • W-15 • W-22

220/440/550 Volt, 1 Phase, 60 Cycle

Modifications & Accessories

A) Voltmeter, Ammeter & Pilot Light Panel
B) Front Enclosure Over Wheels
C) 50 Cycle
D) Multigroove Wheels
E) 3 Energized Wheels (in lieu of 2 standard wheels)
F) Automatic Temperature Control
G) Saturable Core Reactor Type Transformer

Whether you preheat before extruding, or anneal before drawing, or preheat before coating, contact us.

Telephone: PLantations 1-5400

WALCO ELECTRIC COMPANY
131 Blackstone St., Providence, R. I.

UNIFORM

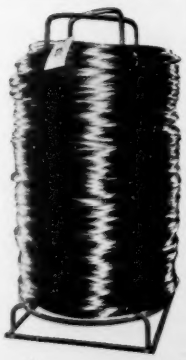
Uniformity of KEYSTONE WIRE helps make jam-free staples

To produce jam-free staples calls for absolute uniformity of wire temper and diameter and unvarying staple dimensions. Holding to tolerances of plus or minus .0005″, International Staple and Machine Company, Herrin, Illinois, manufacture their Gold Crown® carton closing staples. The wire used is a special bright finish, copper-coated steel wire of cold rolling quality furnished by Keystone Steel & Wire Company. This round steel wire must have (1) correct temper throughout the coil, (2) critical tensile range and (3) a copper coating which works perfectly with International Staple's high-speed staple forming machines.

Mass production of steel staples by International Staple has been increased because of the forming characteristics of Keystone Wire which allow the wire to conform exactly to required tolerances and shaping.

In addition Keystone designed and built a platform carrier to control wire take off. This carrier means less scrap, longer runs, better protection in transit, better storage, easier wire handling and less time to set up the wire for the cold rolling operation.

Specifications for your product can be accurately analyzed and every detail closely controlled at Keystone. The wire you require can be uniformly produced through the latest and most exact methods known to the steel industry. Send us your specifications for our recommendations.



No. 16 platform carrier 600 lbs. continuous coil.

Keystone Steel & Wire Company • Peoria, Illinois, U.S.A.

KEYSTONE COLD ROLLING QUALITY WIRE STUDY

KEYSTONE

WIRE FOR INDUSTRY

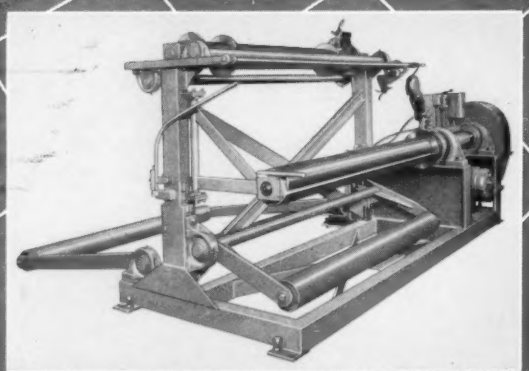
MADE AT PEORIA, ILLINOIS, U.S.A.

MODEL FAB-33 STANDARD SPECIFICATIONS: Type of Fabric. The standard fabric welder is completely equipped electrically and mechanically to produce mesh in the following sizes and spacings.

WIRE GAUGE	LINE SPACING	STAY SPACING
11½ ga. thru 12½ ga. galv.	1", 2", 4", 6" & 8"	1", 2", 4", 6" & 8"
13 " " 14½ " "	1", 2", 4", 4" & 8"	1", 2", 4", 6" & 8"
15 " " 16 " "	½", 1", 2" & 4"	½", 1", 2" & 4"

Standard machine produces 78" wide fabric or multiples thereof.
Other gauge spacings and widths available upon request.

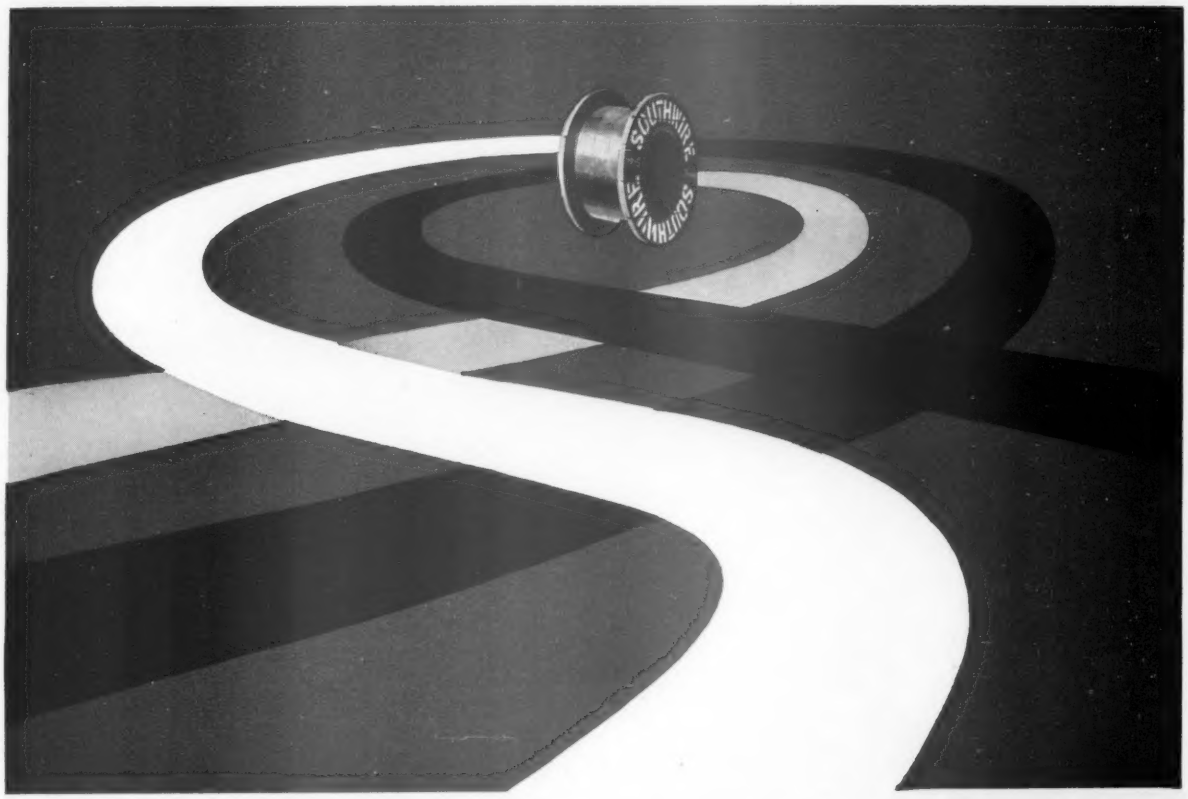
- QUICK CHANGE FROM ONE MESH TO ANOTHER
- HIGH SPEED OPERATION
- AUTOMATICALLY AND PERMANENTLY TIMED
- FULL ELECTRONIC CONTROL — NO RELAY
- FULLY SYNCHRONOUS TIMER, PHASE SHIFT HEAT CONTROL
- THREE PHASE BALANCED LOAD
- LOW ORIGINAL COST, LOW MAINTENANCE COST
- UNIT BUILT MINIMUM INSTALLATION TIME
- OPERATING IN TEN STEEL MILLS ACROSS THE COUNTRY



- CUSTOM AND AUXILIARY EQUIPMENT AVAILABLE TO YOUR SPECIFICATIONS SUCH AS REWINDERS, REELS, STUMPS, CONTROLS, ETC.

SOMMER PRODUCTS COMPANY

7100 S. ADAMS STREET — PEORIA, ILLINOIS



YOU CAN'T WAIT FOR THE WORLD TO BEAT A PATH THESE DAYS

"If a man can make a better mousetrap than his neighbor, though he builds his house in the woods, the world will make a beaten path to his door."

With respect to Ralph Waldo Emerson, competition being what it is in the twentieth century, Southwire has pressed his advice a step further. We have not only endeavored to make better products, but we have also succeeded in . . .

- Operating the industry's largest fleet of trucks for fast delivery to customers' warehouses and jobsites.
- Maintaining flexible manufacturing schedules to meet needs of customers on short notice.
- Pioneering continuous aluminum casting.
- Developing the first 11,000-pound coil of aluminum rod.
- Developing new products through basic research—including 100% free-stripping Neoprene.
- Acquiring a list of loyal customers, of whom we are justly proud.

That our customers have benefited from these achievements is borne out of their use of Southwire products and the consequent growth of our company, which is 25 times larger today than ten years ago.

Specify Southwire and we'll beat a path to your door.

Southwire Company

Carrollton, Georgia — TErrace 2-6311

SOUTHWIRE serves the world

WORKING WONDERS WITH WIRE: at Pittsburgh Steel Company's Monessen (Pa.) Fabric Dept.

Northern Indiana Steel's
rugged, new, operation-proved
WIRE CARRIERS and PAY-OFF REELS

PITTSBURGH STEEL'S $111,000,000 EXPANSION PROGRAM called for a new 125-ton 96-inch wire fabric machine, among many other improvements. To feed this monster, Pittsburgh's Monessen (Pa.) Works makes efficient use of 45 advance-design Northern Indiana Steel Supply Company Wire Carriers and Pay-Off Reels.

SAYS SID JOHNSON, FABRIC DEPT. SUPER:
"Because these wire carriers can safely carry up to 4,000 pounds—depending on the gauge and footage of wire—they help us reduce downtime on this new machine. We now need to weld new reels of wire only every 16 hours, the equivalent of two working turns."

In addition, 500 other Northern Indiana wire carriers have been found ideal by Pittsburgh for *storing* wire. The carriers are easily stacked, leaving maximum use of floor area. Result: good housekeeping with minimum effort.

DESIGNED AND PRODUCED TO YOUR SPECIFICATIONS

Wire Carriers and Reels that

- ✓ **FEED MORE SMOOTHLY**
- ✓ **CARRY UP TO 4,000 LBS.**
- ✓ **STACK AND STORE EASILY**

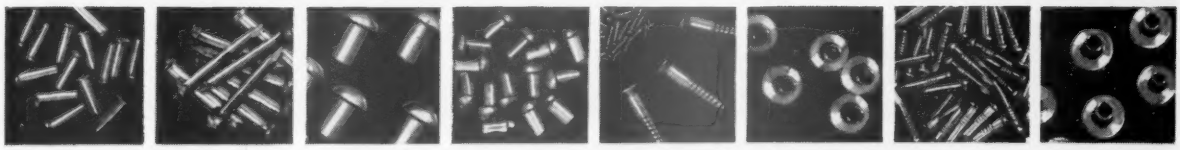
Let us know exactly what your operating needs require. If we don't already have it in stock, we're ready to make up your order as per your specifications. In any case, we'll be pleased to quote you promptly in quantities specified.

NORTHERN INDIANA STEEL SUPPLY CO., INC.

Fabricating Division, Michigan City, Indiana
TELEPHONE TRiangle 4-3241

Titan brass wire

will do any forming job better



This wire is the best for formability. It is brass wire. It is ductile, strong, uniform, sound.

It is responsive to your needs in forming nuts, rivets, bolts, fasteners, screws, nails, eyelets, studs, posts, terminals, washers, pins, cages, novelties, tacks, brads, wire cloth, springs, clips, cables, and a host of other products.

Titan wire is hot-extruded, annealed and drawn to achieve highest quality. You will find it free of defects.

It comes in a wide range of tempers and compositions to meet your requirements.

If you head and extrude, head and drill, or form and bend, we invite you to learn more about Titan Brass Wire. Call your nearest Titan Man.

Write for Brass Wire folder giving grain sizes, weights, tolerances

Established 1915

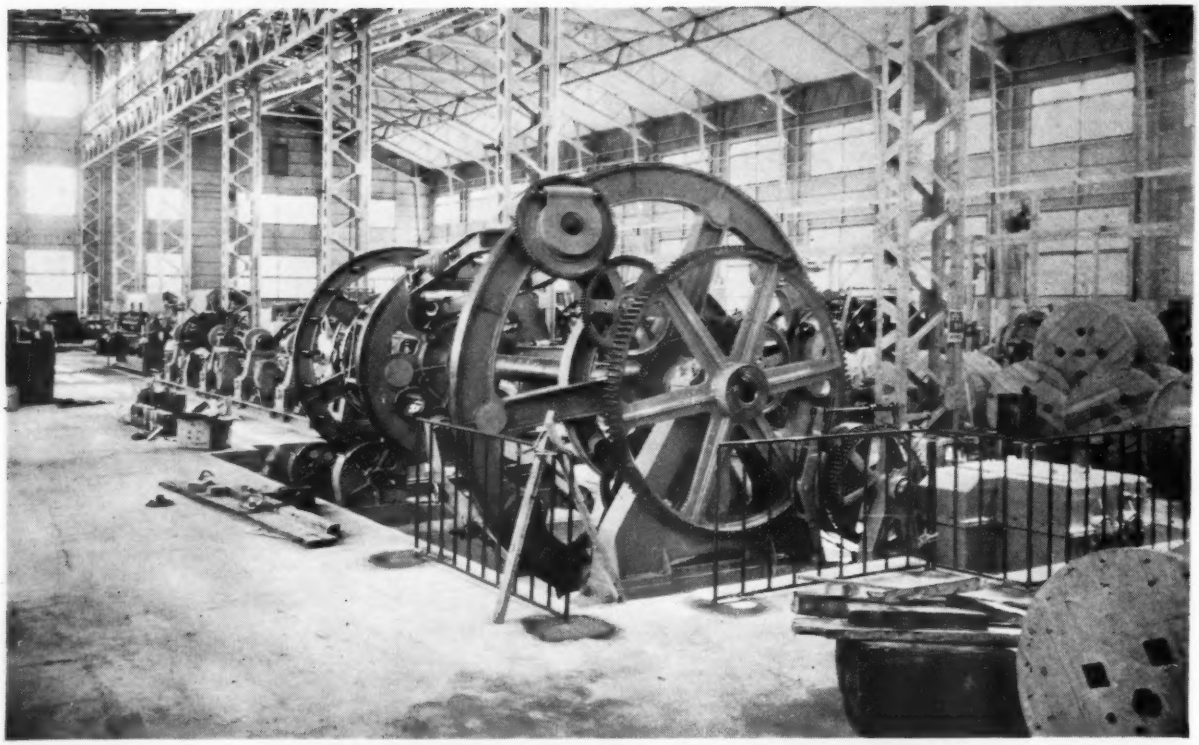
TITAN® METAL MANUFACTURING COMPANY

DIVISION OF **CERRO CORPORATION**

Bellefonte, Pa. • Newark, Calif. • Offices & Agencies in Principal Cities

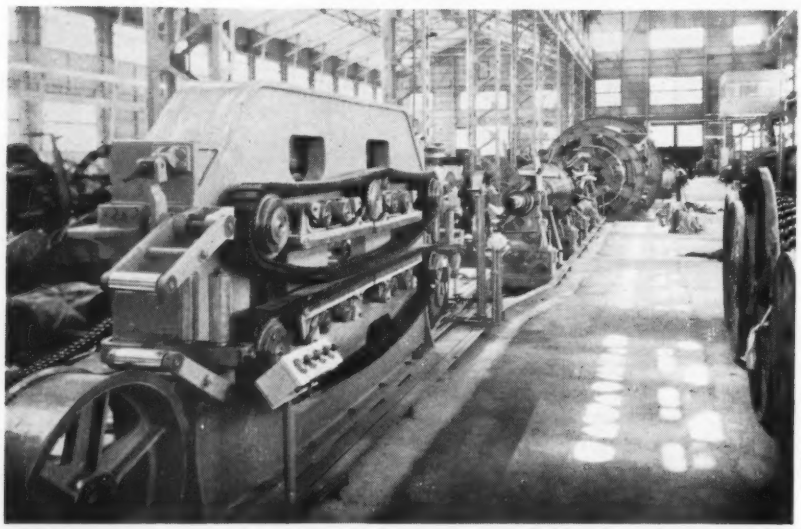
RODS • FORGINGS • DIE CASTINGS • WELDING RODS • WIRE

MIYAZAKI



CABLE ASSEMBLING MACHINE

For 1200 m/m ϕ × 3 or 4 cores

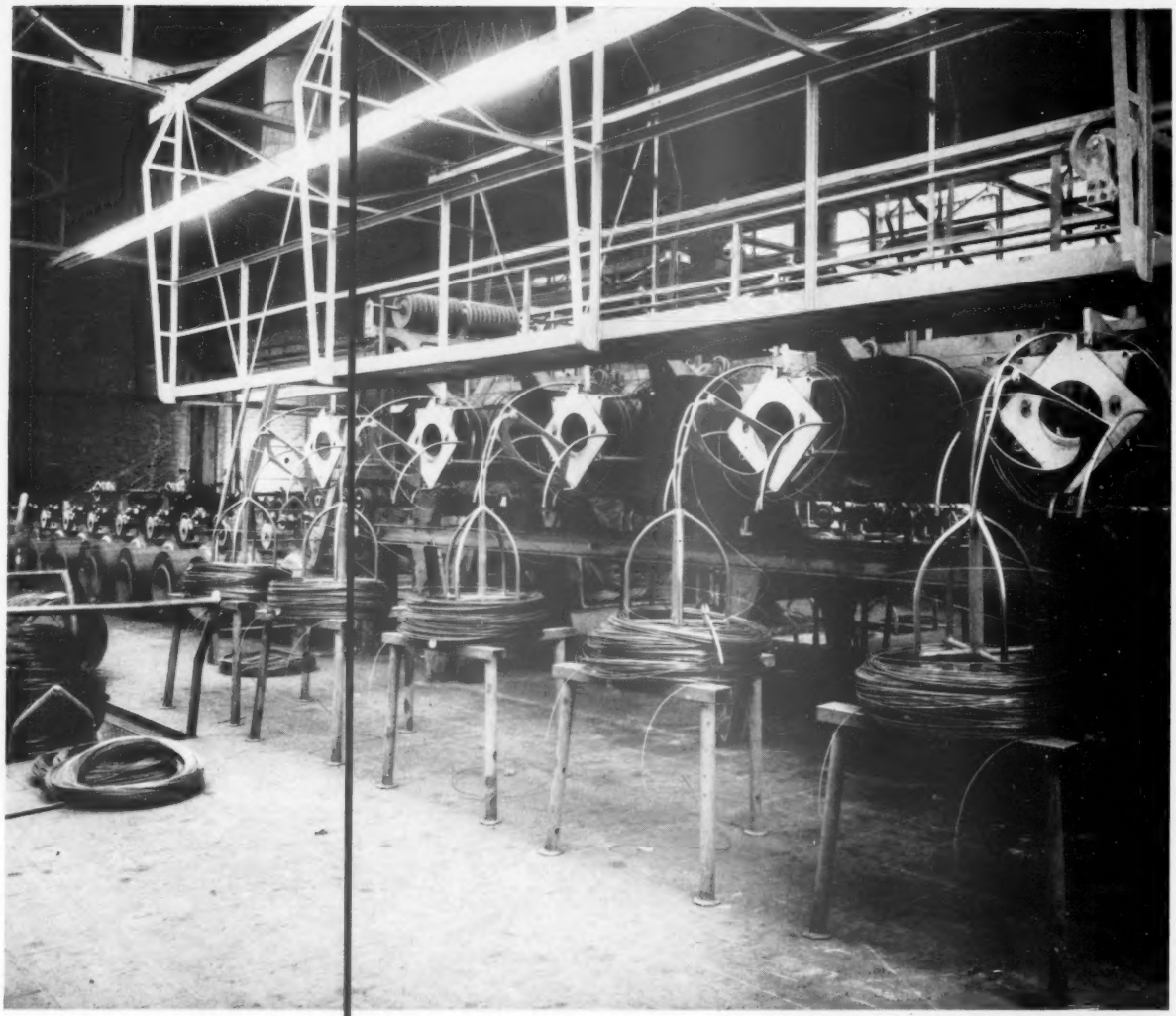


SPECIFICATION

* Core dia. to be assembled. 5～55 m/m ϕ
* Supply bobbin size. 1200 m/m ϕ (in flange dia.)
* Revolution. max. 20 rpm.
* Taping head. 4
* Draw off. Caterpillar system.

Miyazaki Iron Works, Ltd.

Kaizuka, Osaka, Japan.



Wire Takeup Frame (10 stationary blocks), for patented wires, installed above floor level for processing of large coil weights.

WILHELM BREITENBACH
Maschinenfabrik
und Eisengiesserei GmbH
UNNA/Westfalen
Western Germany

BREITENBACH • UNNA

Exclusive representatives for U.S.A. and Canada:
Jedwin Limited, 170 Bloor Street West, Toronto, Ontario, Canada
Telephone: 924-7117

NOW AVAILABLE IN CANADA

NORTHAMPTON MACHINERY PRODUCTS

FOR CABLE MAKING INDUSTRY

AT

CANADIAN VICKERS MONTREAL

EXTRUDERS
Plastic
Rubber

BUNCHING MACHINES

STRANDING MACHINES
Planetary
Tubular

LAYING-UP MACHINES

TWINNING MACHINES

QUADDING MACHINES

PAPER LAPPING MACHINES

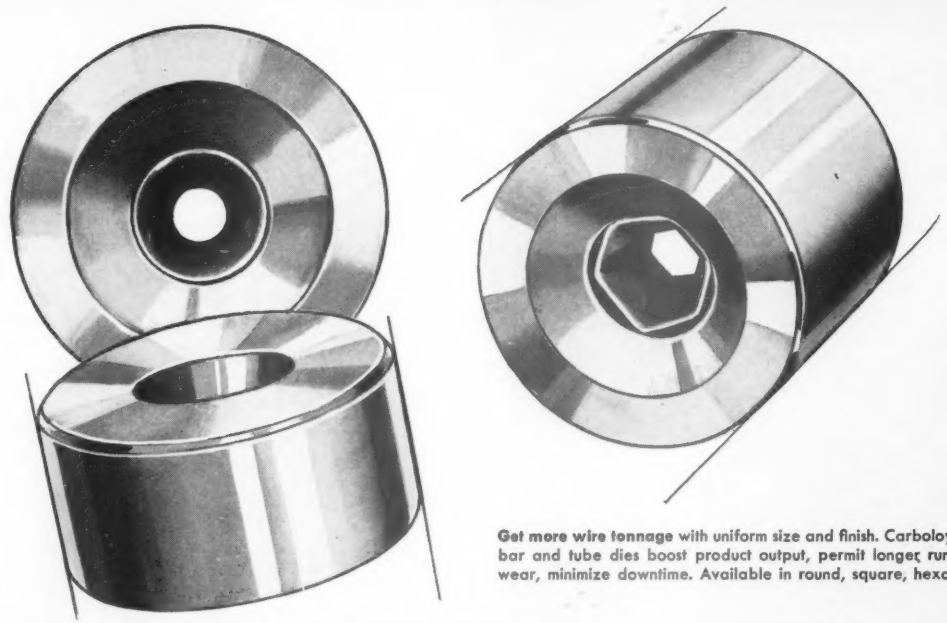
COPPER INSULATING MACHINES

AUXILIARY EQUIPMENT
Supply Stands
Wire Accumulators
Take-Up Stands
Capstan and Caterpillar Haul-off units
Extruder Lines Complete With Cooling, Measuring and Quality Control Apparatus
Special Purpose Cable Making Machinery to Customers' Specific requirements

FOR FURTHER INFORMATION

CANADIAN VICKERS LIMITED
P.O. Box 550 — Place d'Armes Station
MONTREAL
CANADIAN MEMBER OF THE VICKERS GROUP

"MOVING METAL" with Carboloy® Cemented Carbides

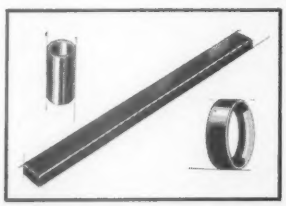


Get more wire tonnage with uniform size and finish. Carboloy carbide wire, bar and tube dies boost product output, permit longer runs with less die wear, minimize downtime. Available in round, square, hexagon shapes.

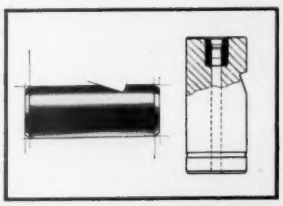
High-quality Carboloy dies mean lower costs . . . less metal waste

How efficiently you *"move metal"* from one shape to another depends on the quality, accuracy and uniformity of the carbide you use. General Electric Carboloy carbides for wire, bar, and tube-forming dies are designed to do the job better at lower cost, and with less metal waste.

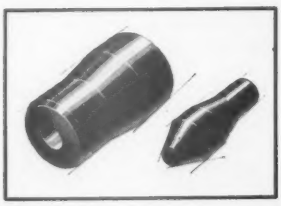
Continuing research by General Electric's experienced metallurgists and technicians results in carbides of highest quality and uniformity—dependability for the job at hand. Call your Carboloy Die Distributor or Die Maker to help you *"move metal"* at lower cost. Or write: *Metallurgical Products Department of General Electric Company, 11171 E. 8 Mile Ave., Detroit 32, Michigan.*



Boost wire production schedules by wear-proofing critical parts with G-E carbide wire guide bushings, strips, and guide rings on wire stranding and processing machinery. Last up to 100 times longer in some cases than those of other materials!



Top quality and performance in boltmaking machinery depend on header extrusion dies equipped with Carboloy cemented carbides—to produce more uniform parts to closer tolerances; resist stress and strain of heading and extruding operation.



Tube drawing with Carboloy mandrels provides uniform wall thickness. Tailored to your order, G-E mandrels come in brazed and solid carbide styles. Brazed-type custom-made from standard and special Carboloy nibs. Available from your Authorized Die Distributor or Die Maker.

CARBOLOY®
CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT
GENERAL ELECTRIC

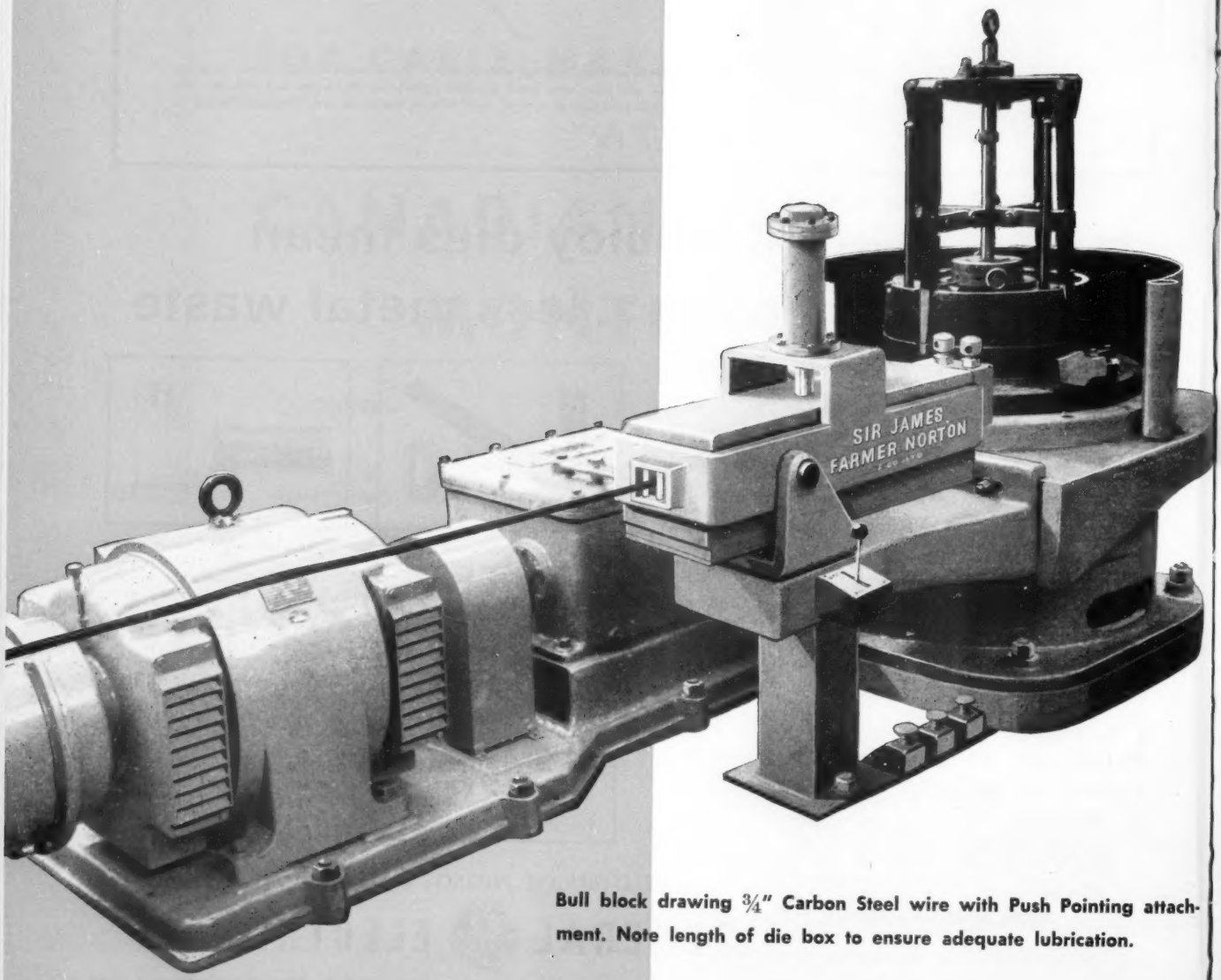
CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

Farmer Norton

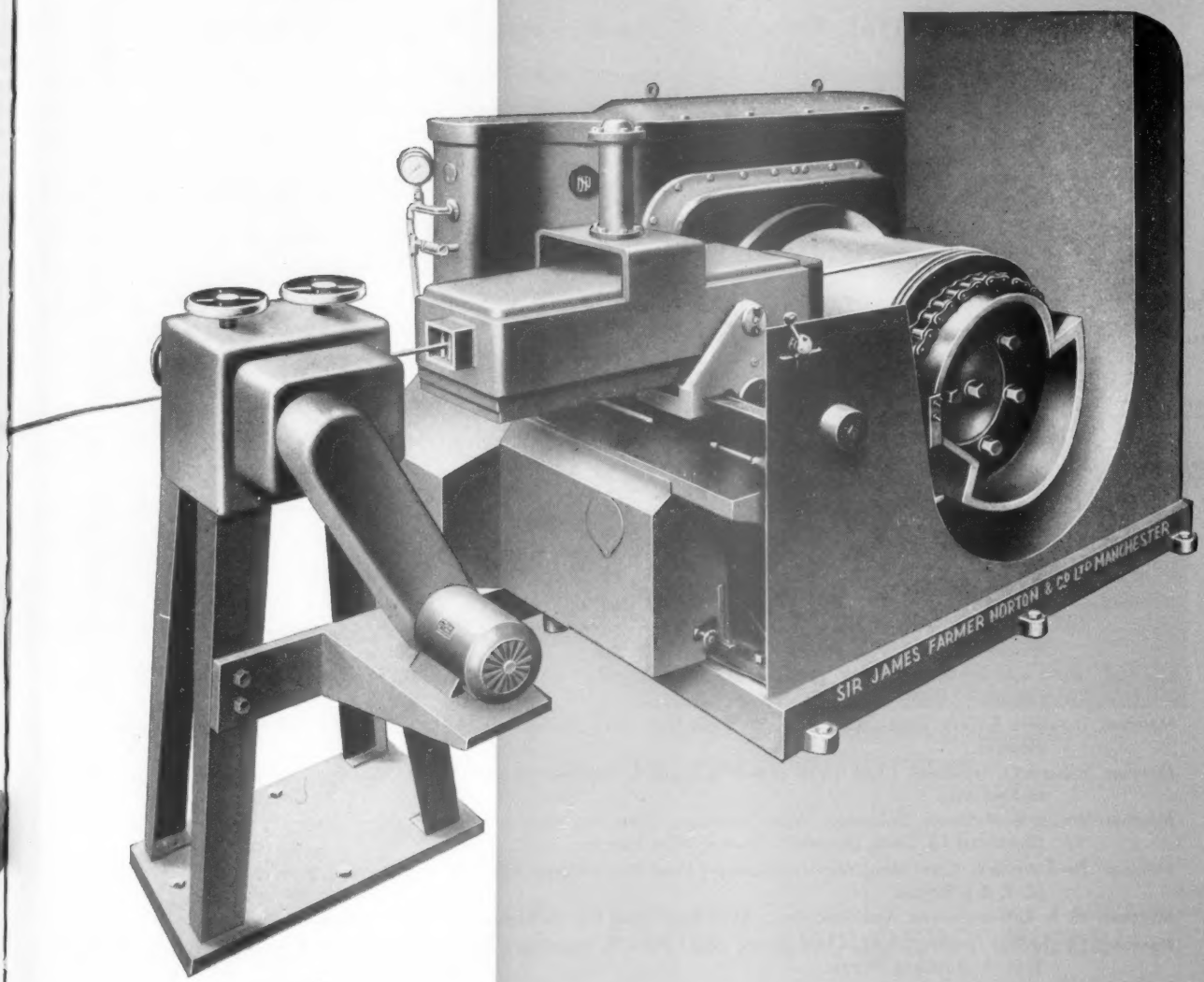
Push Pointing Units

for Wires from 1⅛" to ½" dia.

These Hydraulic Units can be fitted to practically any Bull block drawing heavy rods down to ½" diameter. The handling and pointing of heavy rods has always been a laborious and lengthy process. It is now possible to point and draw on the same machine. The Farmer Norton Push Pointing Unit straightens the first end and points the wire by driving it through the drawing die. The 'dog' may then be attached to the 'tag end' and drawing commenced.



Bull block drawing ¾" Carbon Steel wire with Push Pointing attachment. Note length of die box to ensure adequate lubrication.



Horizontal bull block for 1⅛" diameter Bolt Wire. 36" diameter block. 30ft /min. 80ft /min. 110ft /min. Straightening roll and push pointer supplied.

Sir James Farmer Norton & Co. Ltd.

ADELPHI IRONWORKS, ADELPHI STREET, SALFORD, 3. LANCASHIRE

TELEPHONE: BLACKFRIARS 3613/4/5
TELEX NO. 66492

TELEGRAMS: 'AGRICOLA' MANCHESTER.

Technical Papers for...

THE ANNUAL CONVENTION of THE WIRE ASSOCIATION

October 23-26, 1961, French Lick-Sheraton Hotel, French Lick, Indiana

There still is opportunity for those who are willing to present papers to volunteer. Papers may be placed in any of these categories:

- **FERROUS ROD, WIRE OR WIRE PRODUCTS**
- **NON-FERROUS MECHANICAL WIRE OR WIRE PRODUCTS**
- **ELECTRIC WIRE AND CABLE**

The title of the proposed paper and a brief summary of what you propose to cover should be sent to the Program Committee Member nearest you.

General Program Chairman: John L. Sanderson, Supt., Wire Mill, Keystone Steel & Wire Co., Peoria 7, Ill.

Ferrous Program Committee

Chairman: John L. Corson, Mgr., Webb Wire Div., The Carpenter Steel Co., 17 Liberty St., New Brunswick, N. J.
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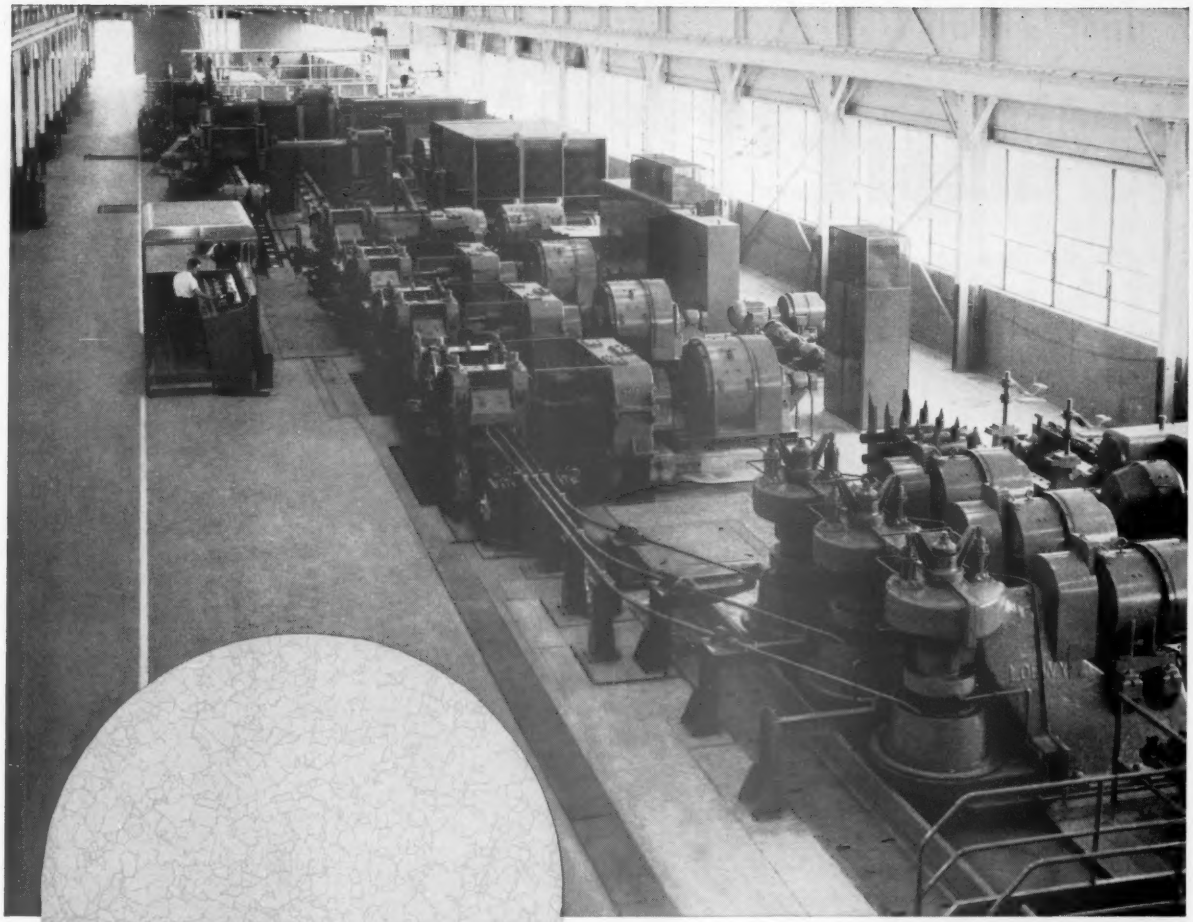
For Electric Wire & Cable Section papers, write any member of the Non-Ferrous Program Committee.

May we count on your cooperation?

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 Main Street **Stamford, Conn.**



B-L-H Loewy continuous copper wire rod mill installation

Photomicrograph of copper rod 200X blow-up

FROM B-L-H LOEWY MILLS . . .
MAGNET WIRE OF HIGHEST UNIFORMITY

The drawing of magnet wire offers the sternest challenge to the product of a wire rod mill. B-L-H Loewy mills provide refined grain and homogeneous rod to fully meet this challenge. High speed rolling provides exceptional uniformity throughout length of rod.

In addition to product excellence, B-L-H Loewy mills provide almost completely automated operation, compact layout, detail refinements and economy. Also noteworthy is the fact that smaller quantities of rod can be produced on B-L-H Loewy mills on a competitive basis.

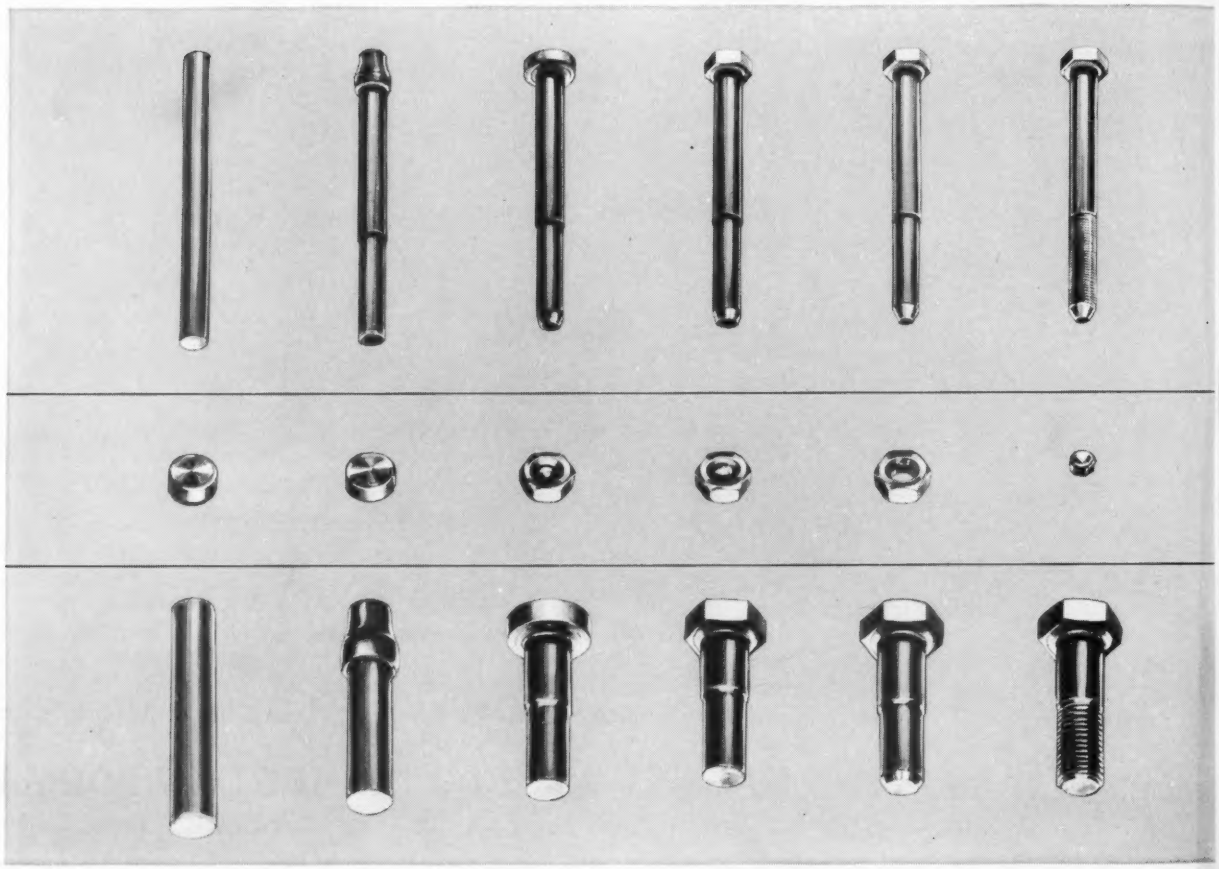
Consult us, without obligation, on a mill which will answer your individual—and most exacting—requirements for wire rod. Write Dept. I-6.

BALDWIN · LIMA · HAMILTON

Industrial Equipment Division · Philadelphia 42, Pa.

Take a lead from the leaders...

AMCHEM GRANODRAW* ZINC TOOL LIFE SUBSTANTIALLY



Typical stages involved in a sample of R, B&W's quality fastener products. Upper row, ½" hex automotive screws; middle row, ¼" hex nuts; bottom row, ¾" screws—all phosphate coated with Amchem Granodraw.

PHOSPHATE COATINGS INCREASE AT RUSSELL, BURDSALL & WARD!

R, B&W producing parts not possible without the use of phosphate coating and lubricant

At the Port Chester, N. Y. plant of Russell, Burdsall & Ward Bolt and Nut Company the use of Amchem Granodraw zinc phosphate coatings are facilitating new, unique and difficult forming jobs in cold headed steel fastener manufacture.

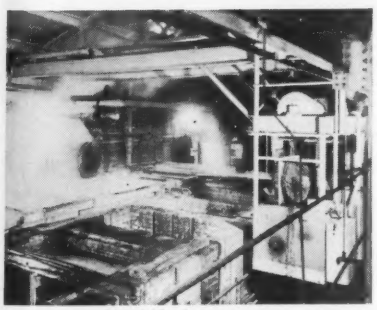
With many thousand different kinds and sizes of nuts, bolts, screws and cold-headed parts being produced in a straight-line operation, R, B&W demands top quality in phosphate coating and lubrication, gets it in Granodraw and Granolube. The results —extra tool life and tool cost savings. Says one R, B&W product engineering official, "phosphate coating has increased our tool life substantially."

Significantly, in operations involving heavier extrusion and severe upsetting, Granodraw has created a flexibility that permits R, B&W to produce parts impossible to make without phosphate coating.

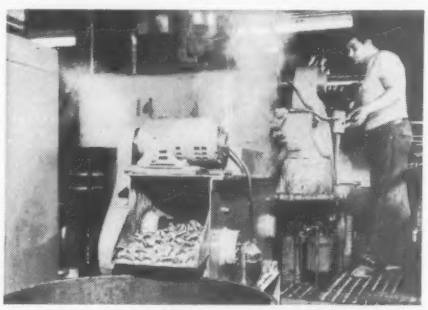
Granodraw produces a trouble-free, uniform coating that remains on the wire through all deforming operations, and still shows on the finished product. Its efficient coating has had a marked effect on machine performance that translates into greater production, fills R, B&W requirements for high volume output.

Consider Granodraw for your operation if you draw, extrude or cold form metals. Its many advantages can save you time, extend tool life and reduce equipment cost, help produce a finer finished product. Get the details from a metal finishing specialist —your local Amchem Representative.

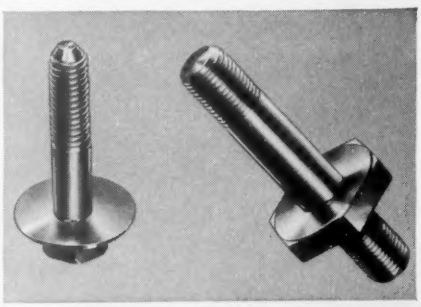
*Amchem's registered trademark for its zinc phosphate coating for steel surfaces.
**Amchem's registered trademark for its pickling acid inhibitor.



In pickle house, crane operator lifts stem-load of rod from Granodraw tank. Note how steam and fumes are confined to bath area through use of Amchem Rodine** pickling acid inhibitor.



Typical of R,B&W's impressive production facilities is the operation of one of their large bolt-makers.



Difficult parts possible because of Granodraw include a hex washer head screw on the left and a 5/16" special stud with a 1 3/8" dia. hex upset collar on right.

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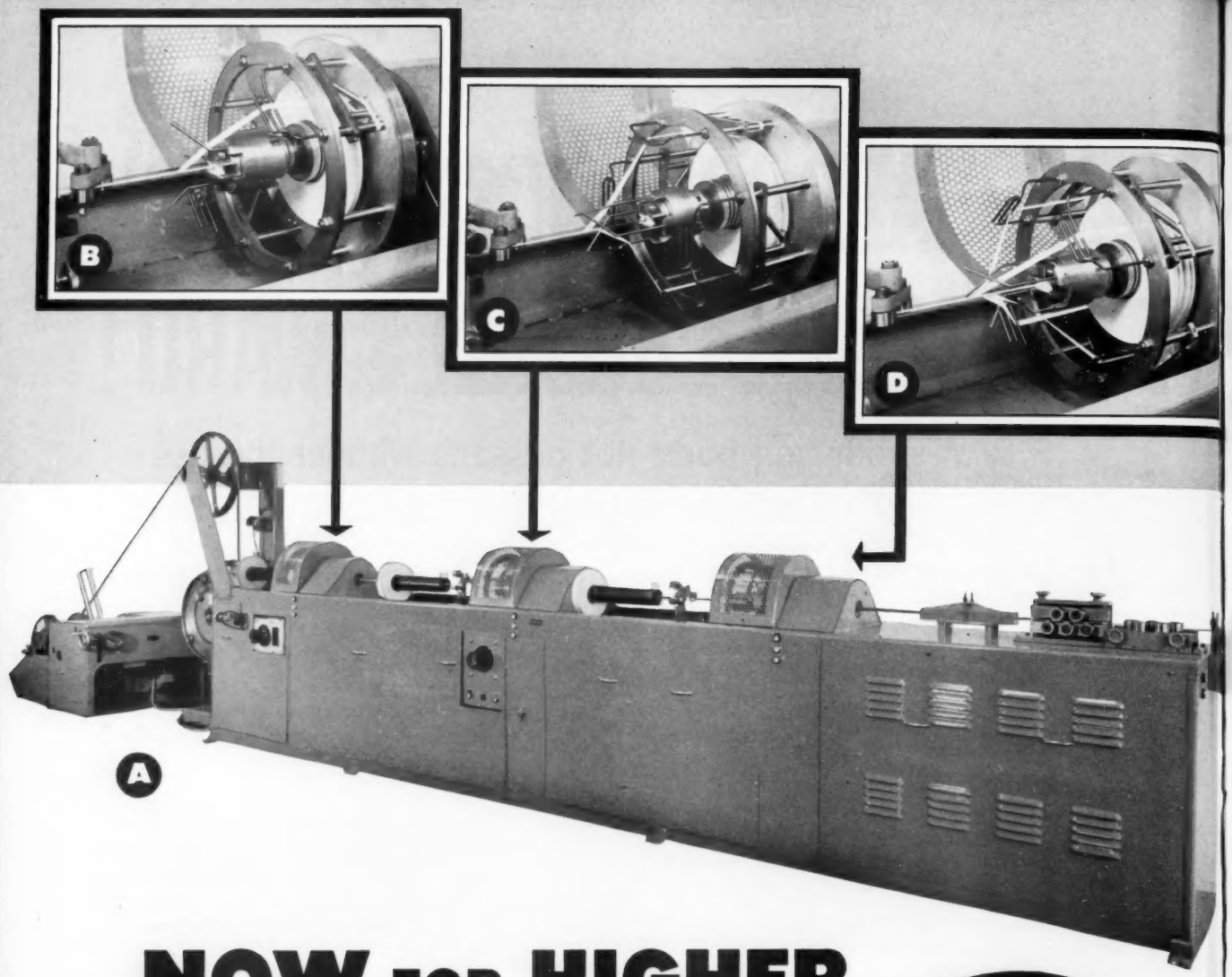

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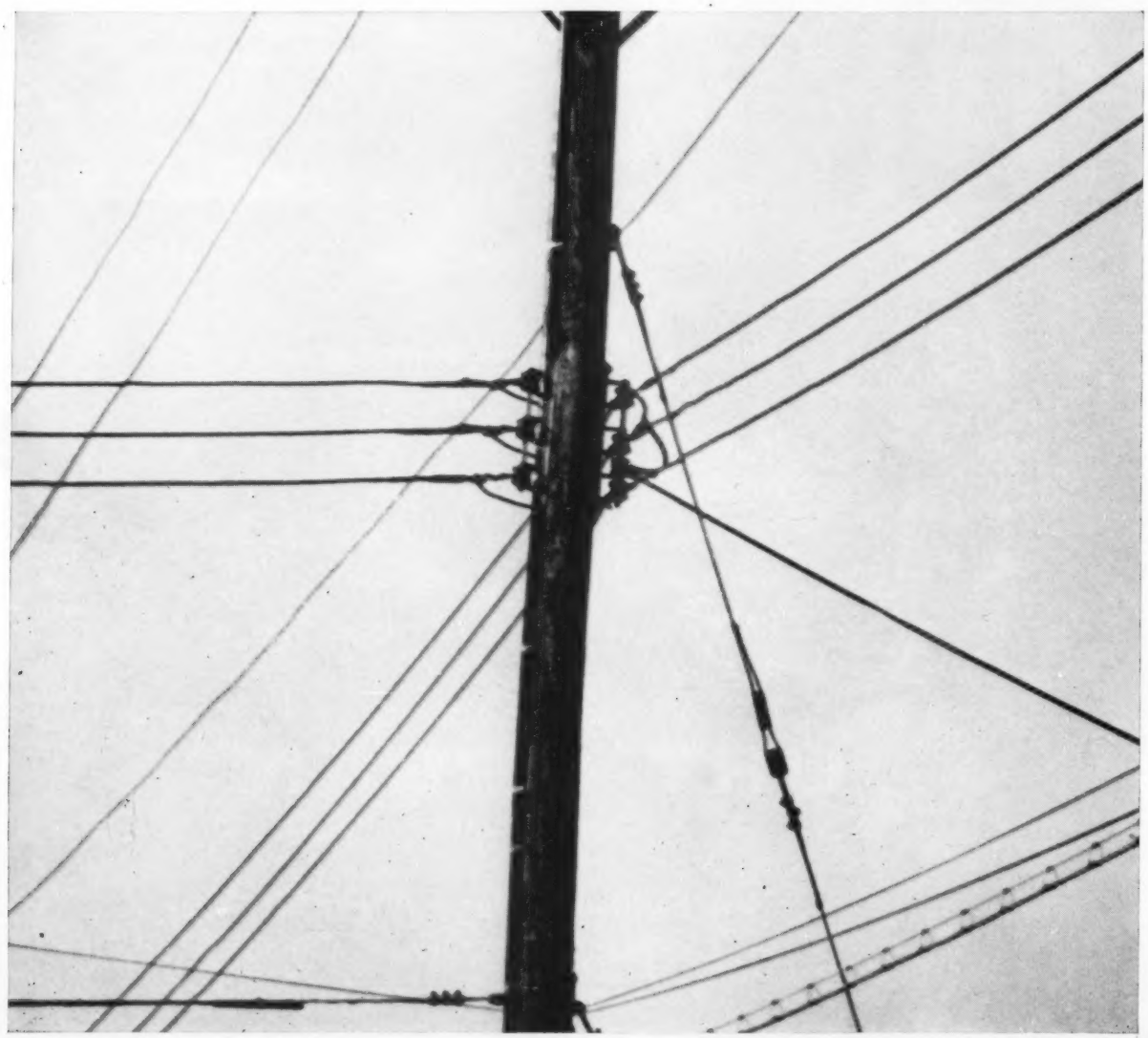
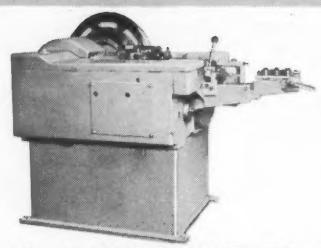
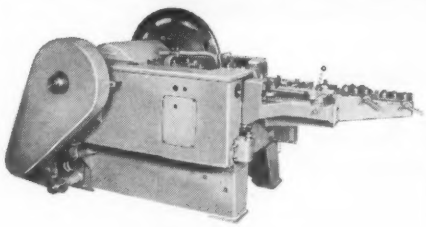




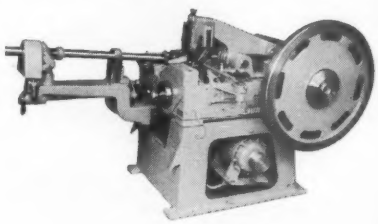
HIGH SPEED WIRE NAIL PRESSES, MODEL N

Built in 6 sizes for the manufacture of Industrial Wire Nails and Wire Tacks in gauges from .028" - .180" and in lengths from ¼" - 6". Also for the manufacture of nails, "T" Heads, or with large and formed heads, with extra long points, Wall Hooks, Machine Tacks, etc. Central lubrication system. With special tooling it is also possible to produce Staples and Grooved Nails. PRODUCTION of Industrial Wire Nails up to approx. 900 pieces per minute.



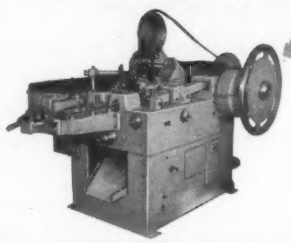
DOUBLE-BLOW PRESSES, MODEL DS

Built in 3 sizes for the manufacture of Upholstery and Roofing Nails, etc., in wire gauges from .055" - .166" and lengths 5/16" - 4-5/16". PRODUCTION up to approx. 440 pieces per minute. Central lubrication system. These machines are a new development and embody all the latest improvements in design and construction of Wire Nail Presses.



CUT TACK MACHINES, MODEL BT

Built in 4 sizes for the manufacture of Cut Tacks made from Strip Steel fed directly from the coil into the machine, in Strip Steel gauges from .039" to .118" and in lengths from ½" to 2". PRODUCTION up to approx. 400 pieces per minute. Central lubrication system. A new design, these machines incorporate high speed production with extremely low maintenance.



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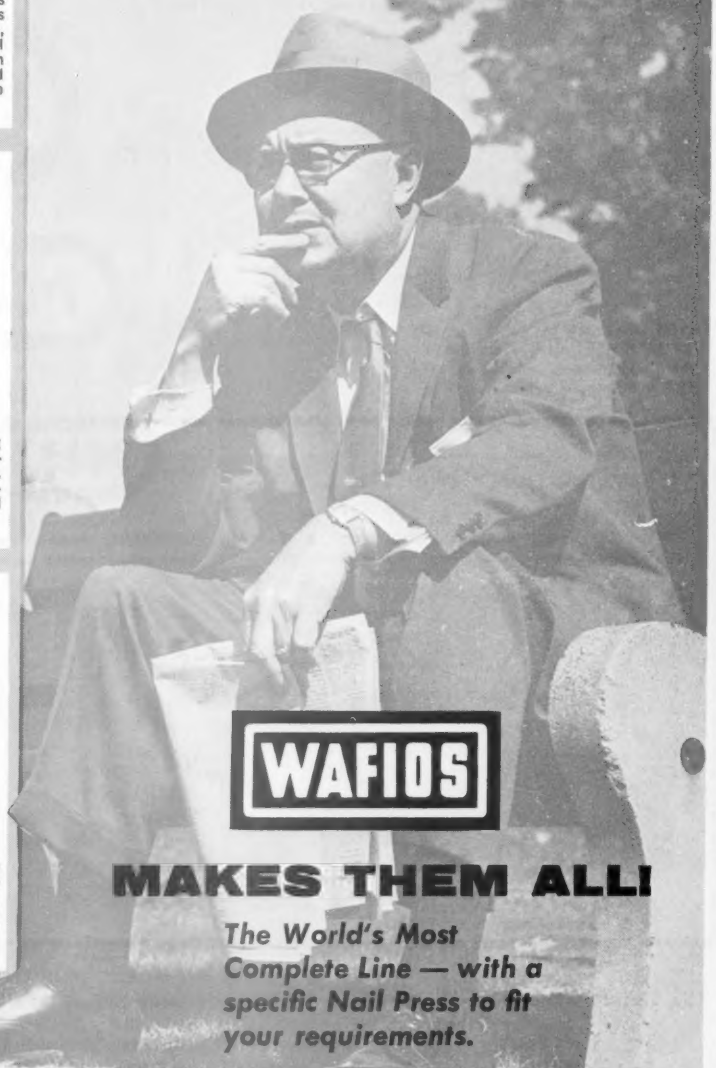

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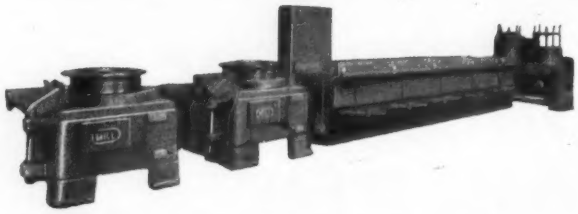

MULTIPLE STRAIGHT-LINE WIRE DRAWING MACHINE, Type MV 25, max. inlet dia. 8 mm. (hard steel), 12 mm. (mild steel), 14 mm. (copper wire).

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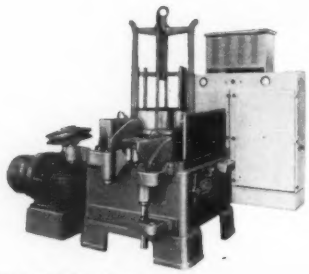

WIRE DRAWING BLOCK, Type TV 25/2, max. inlet dia. 6.5 mm. (hard steel), 8 mm. (mild steel), 12.7 mm. (copper wire).

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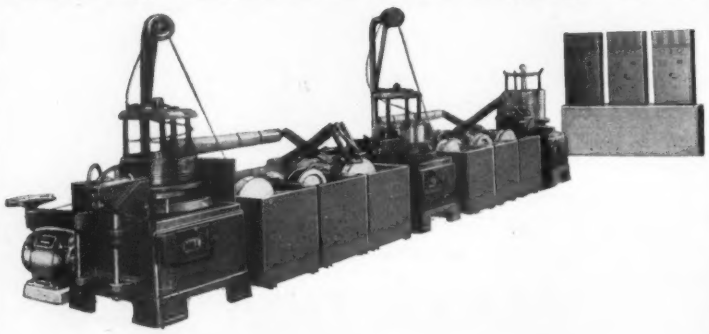
CONTINUOUS WIRE DRAWING AND COPPER COATING EQUIPMENT, suitable for drawing and copper coating hard and mild steel wires for bright copper coated wire.



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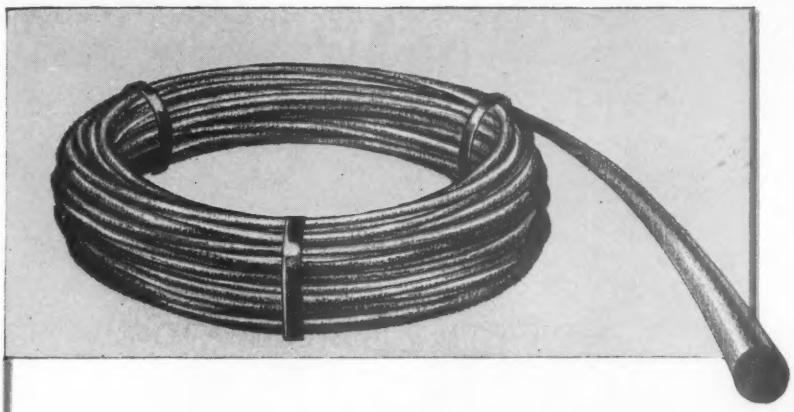

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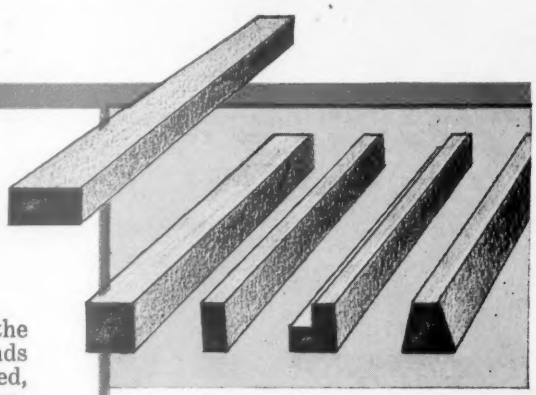

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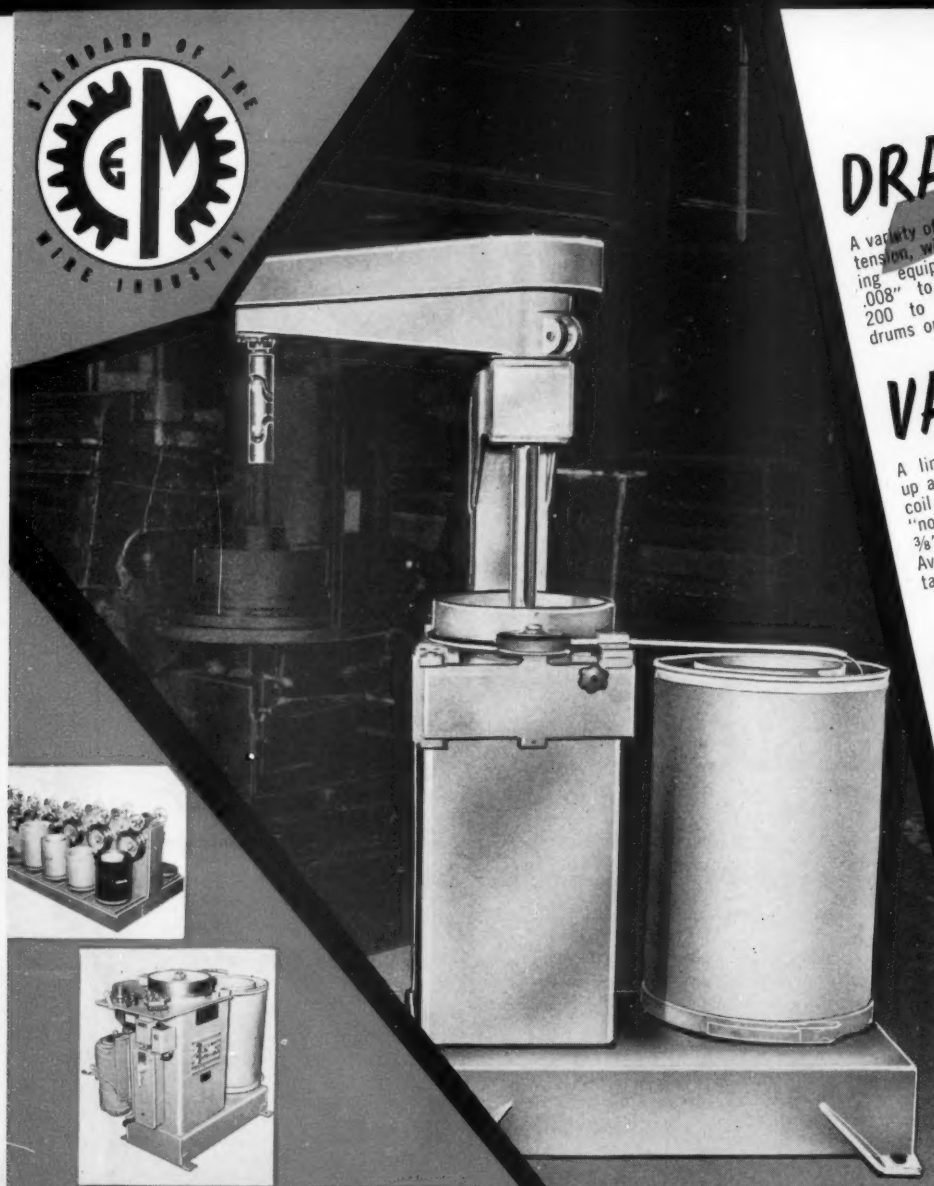

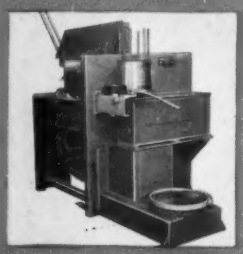

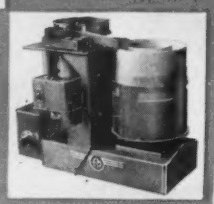

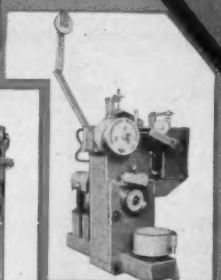

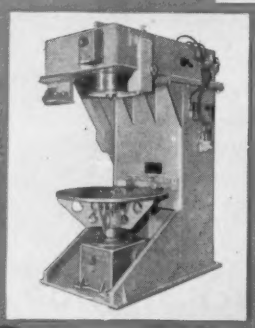

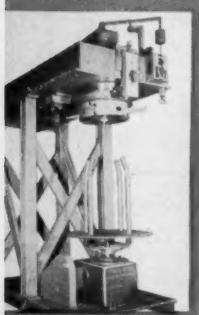

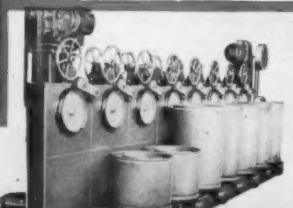

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The Wire Outlook

With the widespread pickup in business in the second quarter, most analysts and executives now feel that the economy is definitely headed for better times, with a greatly improved outlook for the future.

Orders for durable goods have risen steadily and March is reported to be the second month in which new orders exceeded deliveries. Construction contracts have improved markedly, up 12 percent over last year. Home building is 6 percent higher than last year. Personal income, too, increased in March over February by more than 3 billion dollars, one-third of which was for labor. Automobile sales are holding well, although dealers are continuing to offer inducements in high trade-ins, as they did through the winter. Output, however, is under 1960.

Unemployment, over 6 million in the winter, had dropped to around 4,960,000 by mid-April. While the situation is far from satisfactory, particularly for those who need work, the trend is in the right direction.

Prices, according to the Consumer Price Index issued by the Bureau of Labor Statistics, have been edging upwards for many months, and while the increases are small in any one month, over a year they are substantial. These figures are the result of a compilation of many hundreds of commodities and services and are the nearest thing we have to measure the cost of living.

Defense business is big business and it is going to be bigger as time goes on. The Administration is formulating plans to see that small businesses will get a bigger share of arms contracts in the future, as we become more involved in fighting fire with fire in those areas that the Communists are attempting to subjugate. The public is being alerted to this possibility and the costs that will be involved.

The Gross National Product was estimated to be just under $500 billion in the first quarter. For the second quarter it is expected to be $5 billion higher. Guesstimates are that it will be around $510 billion by the end of the year.

Wire mills are doing better than for a long period, in spite of the continuing influx of foreign-produced wire and wire products. Some wire mills have risen to around 70 percent of capacity, although this figure is probably higher than the general average. Specialty wire mills, many of them, are operating at higher rates, but production, being in pounds rather than tons, does not affect the average to any great extent.

One large wire mill reports that orders now are increasing, that the general business atmosphere is better, and that the demand for barbed wire is surprisingly good, considering the large quantities that are being imported. Whereas this mill had curtailed its barbed wire output several years ago, it now is working overtime to fill the demand.

A seasonal upturn has taken place on merchant wire products and wire mesh for roadbuilding and construction. Some pickup for manufacturers' wire is reported. Spring wire and other wire for the automotive industry is in better demand, and high carbon specialty wire orders have improved.

One wire mill has enclosed with its literature a card quoting Abraham Lincoln to the effect that "If we buy goods from other countries, they get the money and we get the goods. If we buy goods in our own country, we get the goods and keep the money." The import question appears to have been as much of a problem one hundred years ago as it is today. Nevertheless, we are in a shrinking world where the movement of goods across seas and international boundaries is bound to continue. Our pressing need is that of reducing costs to remain competitive in the markets of the world.

The recession is over. It is said that, although many feared the worst, it has been the shortest and mildest of the century.

Edmund D. Nichols

EDITOR

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Vol. 36 JUNE, 1961 No. 6

Modern Enameling and Packaging Procedures

by Fred J. Bieber, President
Acrometal Products, Inc.
Minneapolis, Minnesota

In recent years the magnet wire industry has devoted a terrific amount of effort trying to improve their packaging procedures. Fantastic sums of money have been spent. At one period, not too long ago, new packaging ideas were a dime a dozen. Almost overnight everyone in the industry became a packaging expert. Some sources in the industry were so concerned that their competitors would get ahead of them that they had their entire management personnel spending their entire time chasing so-called rainbows in packaging. Just sit back and think what this fantasy has cost the magnet wire industry; yet with all this money that was being spent on packaging there was very little, if any, attention or effort being devoted to one of the most expensive operations, and that is the process of enameling and handling wire.

* * *

At this point I would like to clarify one point before I go any further, and that is, I do not want to leave you with the impression that I feel all of this money that has been spent on packaging has been wasted, because it has not. All of us have learned a lot and out of this evolution in wire packaging I firmly believe that we have finally arrived at a point where we once again are beginning to think straight, and set our sights on where we want to go in the future. There have been some really good contributions made which I am sure, if we analyze the picture, taking into consideration all of the packages with which we are living today, picking out the good points from each and every one, and putting them into one package (which I am sure can be done), we can say that we have made progress.

* * *

There may be a question of why I place so much importance on this matter of packaging. Let us not forget that this problem is the very thing that has obsoleted enameling systems in wire mills throughout the world today. The trend now is toward bigger packages, both on bare and enameled wire. The day is here when the five and ten pound spool is obsolete and it is not uncommon for wire as fine as #42 to be put on a fifty pound spool. Nor is it uncommon for wire as fine as #34 to be packaged in a 100 pound pail or on a 120 pound spool. This matter of packaging today has become rather confused and complicated. In the ten or twelve years that we have been in the spool business, we have seen quite an evolution. In the period up to 1955, wire sizes ranging from #4 to #46 were handled by a range of possibly six different sizes of spools or reels which consisted of the 1, the 1½ or 2, the

Fred J. Bieber

The author is a graduate Mechanical Engineer from the University of Rochester. He started his career as a tool and die maker and tool designer and became Chief Tool Engineer of the V & O Press Company, a machine tool manufacturer. He later became General Sales Manager of this company.

In 1940, he joined the Scovill Manufacturing Company in an executive engineering capacity and after World War II, became associated with Remington Rand, Incorporated, as manager of their General Process Engineering Division.

Later he became associated with Casco Products Company as Vice-President in charge of Manufacturing. He joined Acrometal Products, Incorporated, in 1951 as Vice-President and General Manager, and also, at that time, became a director. In 1953, he became President of Acrometal and today is the major stockholder, as well as Chairman of the Board.

This paper was presented at the Regional Meeting of the Electric Wire and Cable Section of The Wire Association on April 28, 1961, in New York, N. Y.

5 and 10 pound spool; also the 70 to 80 pound, and the 250 pound wood metal reel. Today, in addition to those packages mentioned, we have the 20 pound spool, the 50, 100, and 120 pound non-returnable reel, the 90 pound pail, and the 250 pound drum. There is no reason why, if we as an industry were earnestly interested in standardization, we could not package the bulk of our wire in the size range from #4 to #46 on about four different size packages which would consist of a 20, 50, and 120 pound spool or reel and a 500 or 1000 pound reeless package.

* * *

Very few wire mills today are equipped to face economically the trend toward larger packaging. It has only been in the past couple of years that people in the wire industry have begun to consider increasing the size of their bare wire package, and believe it or not, this trend is moving very slowly because of the expense and problems that are involved. Spool take-ups and traverses on drawing machines, in most instances, were not built originally to handle very large spools or reels. Consequently, present equipment must be rebuilt or replaced. In instances where the producer did succeed in increasing the size and capacity of his bare wire package, he became confronted with a new problem, especially with the finer sizes of wire, and that is the problem of removing the wire from the spool or reel when it comes to annealing and enameling operations. The larger, heavier package produces greater back tension, which in turn stretches the wire and as a result the conventional inexpensive let-off rack, which the industry had lived with for years, became obsolete. We will go into this question of let-off racks a little further on.

* * *

This evolution has brought about the realization that operating speeds and efficiencies must be increased when it comes to annealing and enameling. Present procedures and equipment have become antiquated, which means that we must consider higher speed annealing, improved methods of applying enamel, and greater efficiency in our ovens.

* * *

Take-ups used with our enameling systems have within a few years been called upon to do jobs for which they were never intended or designed. I mentioned previously the six standard sizes of spools or reels that the industry was using prior to about six years ago. Most of the spool take-ups used in the industry today were designed to handle these few spools or reels, yet presently, in addition to these packages, we are trying to adapt this same equipment to take care of all the additional packages that have come along during recent years, and I don't believe that it can be done economically. Let's take an example: most fine wire spool take-up equipment was designed to take care of the five, the ten, or possibly in rare instances, the twenty pound spool. Today it appears fairly certain that this same wire that was packaged on these spools is in most cases going to be put up on forty to fifty pound reels. There is no trend at this time to eliminate the smaller spools which were referred to, so in addition we find ourselves with all that we had in the past plus one big headache that the majority of spool take-ups can't handle. This same problem applies also to packaging the heavier gauges of wire. A few years ago we had two or three sizes of wood metal reels to worry about, today the take-ups on these heavier gauges of wire must, if they could, handle several additional sizes of non-returnable reels and in addition, pails and drums. Some of you, I know, have spent many hours trying to figure out a way to convert economically your present equipment to meet these requirements; from the way it appears, it looks as though the sponge is about ready to be thrown into the ring, because all of a sudden there has arisen a demand for re-spooling equipment that will handle the making of all of the packages with which we now are blessed, taking the wire off the spools that can be handled on the older equipment that has been in use in the mills in the past. * * *

I don't believe that it is any secret to the industry that my company has for some time been doing extensive research and development work on a complete enameling system which will meet the demands of today, as well as the extended future. We have taken into account all of the bare and finished wire packaging problems to which I have previously referred, and in addition have tried to analyze what could be done with annealers, applicators, ovens, and the entire system in an effort to increase productivity and efficiency. We are vitally interested in cutting your operating costs. It is apparent that I was invited by your committee to give this paper here today because you, as an industry, are interested in knowing what has been accomplished. Without going into much detail I will attempt to describe to you our conclusions of what we feel should be designed into one complete enameling system. I do not have any pictures or charts with me because at the time that this paper was written many phases of the equipment that I will describe to you were still in the process of being built. * * *

We presently are building a 20-wire unit for handling wire sizes ranging from #24 to #34 A.W.G. Into this system we are incorporating the results of years of experimental and development work, and the final result will afford the industry the opportunity of seeing a complete enameling system in operation, featuring the ultimate in modern engineering and design. This unit is complete, made up of the very latest in reel let-off equipment, an electrically heated, horizontal, high velocity recirculating pre-annealing oven, an enamel supply system including the new dieless applicator, a vertical two-zone gas-heated high velocity recirculating enameling oven, and a 20 vertical spindle individual torque motor spool take-up unit that will handle spools ranging from 5 pound to 120 pound capacity. In addition, this take-up unit is equipped so that, if desired, a taper wind can be wound on a straight barrel spool. This spool take-up unit is designed so that, by extra attachments, the wire can be pail packed as well as wound on a spool, on the same machine.

* * *

I know that before I am through, I will leave many questions in many minds. Therefore, I wish to extend

an invitation to any company who is interested and has questions, to send its representatives to our plant in Minneapolis, Minnesota, to see this innovation in an enameling system in actual operation. We plan to have open house during the month of May, and an appointment to inspect this equipment can be arranged by contacting our sales department.

* * *

From the response which we have had to our program from people in the industry who were somewhat familiar with what we were doing in the line of research and development, we know that some sources have given considerable thought to this entire problem, and in some cases, some wire companies have gotten themselves deeply involved in the designing and building of equipment which they felt would meet the requirements of the present as well as the future. This practice has been costly, and in but few instances, satisfactory. Some of the equipment that has been built was found to be obsolete by the time it was completed, and the fact that this equipment was designed and built by individuals from within a company often brings about the usage of such equipment, whether it comes entirely up to expectations or not.

* * *

A lot of the oven equipment built has been of the radiation type or variations thereof. I believe all of us realize the limitations of this type of equpiment, such as its inherent control problems, which include its dependence upon environment for successful uniform production. Designers of this type of system were not only faced with a problem of operating a system where the oven itself has to be controlled, but also the area in which it operates. The operating speeds are limited, which in turn affects the productivity of the system. Some sources have claimed that operational speeds have little effect upon production. This is true only to the point where the patrol area for efficient operation becomes a definite time factor. An analysis of this fact can lead to surprising conclusions. There are operations which call for a patrolled or process inspection; here the number of wires required for a given amount of production becomes an important factor.

* * *

In recent years the popularity of the radiation type of system has decreased and more and more attention has turned toward the high convection type. This change was brought about by the ability to increase capacity and obtain a greater or more reasonable return on investment. At the same time it became possible to improve controlability, productivity, and uniform quality. Some of the earlier high convection systems proved to be somewhat disappointing to the degree that they did not operate too efficiently, due in part to failure to eliminate radiation as much as possible, particularly in the upper zones of the oven.

* * *

Delving a little deeper into high convection principles, we find two major causes for improved performance. One of course is the increased ability of the rapidly moving heated air to transfer its heat, and the other cause is based upon the theory that solvent films are whisked off of the wire, breaking down the insulating effect that they have in a radiant type of system. It is the feeling that these two major factors are primarily responsible for production speeds of 2 to 2½ times that of conventional equipment, and at the same time afford the possibility of operating at temperatures between 100 to 150 degree F, lower than comparable pieces of equipment.

* * *

Since in the high convection system we are describing air velocity as well as air temperature the cure of the film can best be described as "effective bake", or in other words, the amount or degree of cure the wire ultimately "sees" as it passes through the work tube. Velocity becomes an extremely reliable and instantaneous control source. As an example, let us say we are starting the equipment after a period of inactivity. We bring our equipment to operating temperature and "dial in" the desired velocity. Should we find our wire to be slightly undercured we have but to increase velocity slightly to increase our cure instantaneously, cutting the time required for heat corrections to become effective. We must at this time mention that it is generally believed that changes in velocity above 1200 feet per minute have slight if any effect on "effective bake." However, below 1200 feet per minute slight changes in velocity do affect effective bake to a degree which renders velocity the best tool of control that has been devised to date.

* * *

In the system we propose that the moving air be brought around at the top and bottom of the oven, and the air drawn from the work tube at the center. This system has several major advantages in that we draw off the low boiling point solvents at the center where their removal is most effective and have a single supply fan for a distinct two-zone system. With the equipment divided into an upper and lower zone, complete flexibility of air and temperature pattern can be realized. We know, for example, that different heat patterns are desirable for different materials. Enamel (Oleo-resinous) is a material that will tolerate being subjected to high temperatures immediately upon entrance to the work slot, whereas materials such as Formvar, require an accelerating heat pattern. The lower zone can be made all or partially radiant at will, merely by the simple adjustment of a baffle or baffles as required. The upper or exit zone remains always a high velocity section completing the cure after the low boilers have been removed. The need for versatile equipment has taken the spotlight principally due to the profusion of insulations and the fact that orders for given sizes and constructions seem to be shrinking in tonnage. This means that were we to have equipment with a capacity of 20 heads that could be run on just one wire size at a time, there would be times when half or more of the equipment would be idle. Since this is a condition that must be faced, it is mandatory that the equipment be controllable across its width as well as its length. As explained before, the effective bake has now become a function of air temperature and velocity. We find that we can control velocities across the equipment much more accurately and obtain

much more stable conditions than attempting to change the temperature across the oven. In the equipment proposed, this practice has been carried out to the optimum. The slots carrying high velocity air to the work tube are divided into 4 or 6 sections, depending upon the size of the equipment, and each section is dampered. Thus, the air velocity to the work tube can be varied merely by restricting the desired sections. Since the supply fan is delivering constant pressure, the adjustment in a given section does not necessarily upset the other sections, allowing control and dependability never before attained.

* * *

Fume incineration has been and still is a consideration in the modern enameling system. Here again, incineration by flame and/or catalyst has met with varying degrees of success. This is due to the inherent properties of different materials. As an example, the solids and solvents having to be removed in the process of making oleo-resinous insulated wire incinerate more efficiently in a flame as do the products connected with Formvar. Combination systems, that is, systems using both principles of incineration have been used in the past, but, frankly, results have never been quite satisfactory.

* * *

The latest in burner design will enable us to incorporate the two systems with a degree of efficiency never before thought possible. In the cases where electrically heated units are used, it may well prove possible to incorporate the heating unit and incinerating unit into one complete plug, which then can be plugged into the equipment and removed for ease of service. Should solvent recovery systems be a necessary part of the equipment, a heating unit without the incinerating features would be used.

* * *

We have discussed the fact that we have accelerated production speeds; this has not been done without obstacles rising upon the scene. One problem is the fact that the wire emerging from the exit of the work tube is still carrying with it or emitting enamel fumes, which stray into the surrounding area. To control this, a section known as a de-celeration chamber is placed over the exit. This section is actually an unheated extension of the work tube, that forces the incoming air to sweep these maverick fumes back into the oven and at the same time facilitates cooling the wire.

* * *

Many of us have listened to the age-old arguments and all of the pros and cons of the vertical versus the horizontal oven. Some people, not caring to be an exponent of either, have inclined their equipment so it is neither horizontal nor vertical. Since, as stated before, we have evolved a unit which creates the optimum conditions for film curing within itself, and has no dependence upon environs, it is possible to operate this unit in any desired position—horizontal, vertical, inclined, or what-have-you.

* * *

All of the latest modern materials and methods of construction have been incorporated into the construction of this oven unit, such as the use of stainless and aluminized steel for interior construction. Aluminized steel is a corrosion resistant material used where stainless is not necessary. Sealed heat proof damper controls, having dampers, burners, catalysts, and other components mounted on plugs for ease of removal and service when necessary.

* * *

Catalyst mountings which insure a tight seal but can still be slid into place. Door panels on the entire oven front which makes internal access to the work tube simple and efficient. The use of modern insulations of both the rigid and non-rigid types have allowed the use of internal insulation which heretofore has been possible but not economically practical.

* * *

At the very beginning of this paper several remarks were made with regard to the packaging problems with which the industry has been faced over recent years. In designing take up equipment to be used with this modern enameling system we tried to evaluate what the future in wire packaging would ultimately bring. We have one conviction as to what would be most economical for the industry over the long years ahead and have designed our take-up equipment to accomplish this end.

* * *

Today we have two principal methods of packaging magnet wire —the old time-proven standard of spools and reels and the more recent innovation on the market, the bulk-pak, whether it be pails or drums. Both of these systems have good and bad points that must be considered, not only by the wire producer, but by the ultimate user. Forgetting the ultimate user for the moment, and turning our attention to some of the producers' profit-robbing problems, we find the natural solution to the problem is to combine the two methods in a long traverse, non-returnable reel, which affords all the advantages of both systems. Let's list a few of the more important ones:

1. **10 to 20 more pounds per package.**
2. **Allows for the possibility of reducing packaging cost per pound.**
3. **Allows faster and better rewinding than pails or drums.**
4. **Facilitates better inspection practices.**
5. **Allows much higher pay-out speeds.**
6. **Decreases field trouble and complaints.**
7. **Reduces material handling.**
8. **Allows for the packaging of finer wire on larger packages.**

* * *

We momentarily dismissed the end user; now we can consider him, and we find from the above that what's good for the producer is also good for the user—he ultimately profits also. The take-up equipment for this type of packaging must, in addition to traverse requirements, have the spindles arranged in a vertical plane. This is particularly true, and actually mandatory, if satisfactory results are to be had in filling these larger packages with fine wire, the reason for this being that the torque requirements become so low, loping or running ahead is experienced as the package fills. The vertical spindle arrangement eliminates this condition entirely and trouble-free packaging results. To keep operations simplified, a self-delivery output capstan is used, which enables one man to remove the finished reel and start another, without interruption to production. We shall discuss capstan arrangements in a little more detail later on.

With the spindles mounted vertically this equipment, if the customer so desires, can be furnished to accommodate spooling as well as pail packing. This arrangement is such that wire can be packaged on spools or in pails simultaneously, should production requirements so dictate. It is possible to split the take-up into two or more zones of control to facilitate multiple simultaneous production, that is the production of more than one wire size at a time. Take-up equipment for the heavier sizes of wire, 23 and heavier, will accommodate reels as well as drum packaging whereas in the finer sizes, 35 and finer, the take-up equipment will accommodate only spools and reels.

* * *

While in a couple of instances I have made reference to the fact that the industry could, if it so desired, standardize on packaging, we can't lose sight of the fact that presently we have several sizes and types of packages. I am sure that it is going to take a lot more pioneering than I can do in one stand with one paper to the wire industry to get the industry to eliminate any of the packages that we have today. Therefore, in designing modern spool take-up equipment we must engineer and design to have a universal type machine to meet all packaging requirements. This we have done, and in addition to what I have described so far, the take-up machine which we have designed has a common traverse drive which is driven by an individual variable speed motor so that the lay of the wire can be varied to meet varying wire diameters. Machines have been built where the traverse has been split into two or more zone controls with a common traverse drive for each zone. This makes for more versatility. The traverse drive in addition to being versatile, also can be arranged with a drive attachment whereby a tapered wind can be put on a straight barrel spool of any length traverse. All of these features combined make this take-up machine versatile enough to take care of any one of the wire packages that we have today plus the fact that the trends and demands of the future can be met.

* * *

With the trend towards greater production speeds and larger bare wire packages, more thought is necessary regarding the design and construction of spool and reel let-off racks. Stretch and tension require greater consideration, especially when handling the finer gauges of wire. We can no longer live with the crude let-off unit consisting of a few pieces of angle iron, possibly a couple of cheap bearings, a piece of sash cord and a weight. Modern let-off equipment is a carefully designed and an accurately built piece of machinery having mechanical brake tension controls, the finest in bearings, wire guide rolls, and accessibility to make it convenient for the operator to load and unload spools or reels. In a good many instances, especially in handling the fine gauges of wire, it has been found that it is advisable to assist the bare wire let-off by a power unit. This can be attained by the use of a torque motor controlled by a powerstat whereby the wire tension can be controlled to a bare minimum. It is not uncommon to pay off a 40 to 50 pound spool of wire as fine as #44 gauge with as little as 5 grams tension on the wire with a powered let-off as referred to. The let-off racks on the machine which we will demonstrate are located directly under the vertical take-up spindle so as to conserve space. These racks are designed to hold what we believe will be the largest foreseeable bare wire package for the 24 to 34 AWG range for some time in the future. The wire is removed from the reels at constant speed by means of a powered input capstan.

* * *

Capstans for feeding the wire are of vital importance with modern enameling systems, especially where concern about stretch is an important factor, due to the fact that modern thinking is to increase the number of wires run thru a system. Considerable thought must be given to design of a capstan unit so that the operator can string up a system with the minimum amount of contortions. It has been found that the use of a powered input as well as a powered output capstan system is most desirable. This applies to a system handling the heavier gauges of wire. On a fine wire system in the area of #41 and finer, this point becomes optional. However, in this area it is desirable to use a torque motor powered let-off unit for the bare wire spool and then have all guide sheaves power assisted. Reverting back to the powered input and output capstan systems, it is important that they be driven at constant speeds either by a common drive or a synchronized motor drive system. It has been found, however, that the input capstan should be a little slower than the output capstan. This can be accomplished by varying the diameters of the capstan rolls to achieve the desired results. The slight variance in capstan diameter, of course, slightly varies the speed between the two units which tends to eliminate wire vibration. Capstan arrangement is important for continuous trouble-free operation. The self delivery type of capstan arranged properly will allow individual starting without the necessity for picking wires through or around running wires. The self delivered feature eliminates the danger of human failure when cutting finished wire and eliminates the need for start-up spindles since the start-up scrap can be run directly into a scrap receptacle.

* * *

Over the years large sums of money have been spent by various people in an effort to come up with an improved method or procedure for applying enamel. Most of this effort has been directed in the direction of improving or eliminating the die. We have all, in this time, seen several versions of the die come and go. Yet today, I believe that the dog house type of die is still the most universally used die in the wire industry in connection with enameling operations. It has been the dream and hope of every magnet wire producer that some day some one would come up with a dieless method of applying enamel. This day is now here.

* * *

A few years ago in Europe a dieless system of applying enamel was introduced. While several American producers of magnet wire became interested in this sys-

(*Please turn to page* 807)

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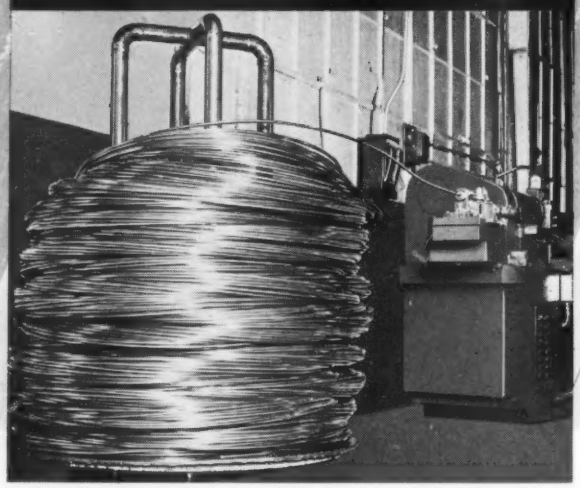

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The Vacuum Hopper in the Extrusion of Electrical Insulation Using PVC Dry Blends

by

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Introduction

The extrusion of PVC wire insulation from the dry blend form has been of interest to wire manufacturers for many years. The economic advantages, reduced overhead and capital equipment, compounding versatility, etc. are well known. Some manufacturers are successfully extruding from dry blend, at least in thin wall constructions. Other manufacturers have attempted dry blend extrusion, but, because of difficulties, have returned to the use of diced compound.

* * *

The main reasons for the restriction of dry blend extrusion to thin wall constructions, where high stock pressures are generated, and the complete rejection of the process by many manufacturers, have been porosity and rough surface in the extrudate. Porosity and rough surface have been unpredictable and uncontrollable, occurring under apparently the same conditions which previously produced good quality product. Porosity and rough surface have been particularly severe in thick wall constructions and in all extrusions conducted at high output rates.

* * *

Several developments in extrusion technology and equipment design have helped to alleviate these problems to a certain extent. Valved extrusion[1] has contributed to greater success in extruding products of reduced porosity. Vented extruders [2] have been successful in the elimination of porosity in some cases. Improved screw design has contributed to progress.

* * *

Work in this laboratory has shown that wire insulation completely free of porosity, having excellent surface quality and excellent physical and electrical properties, can be obtained consistently at high rates by the extrusion of dry blends with the aid of a vacuum hopper. It had been shown previously that the causes of porosity and rough surface are mainly air and moisture in the blend.[3] Thermal degradation products and plasticizer volatility do not appear to be factors under normal conditions.

* * *

Dry blends having high rates of flow are important in the vacuum hopper process. Several PVC resins are available, characterized by large particle size and unique plasticizer absorption qualities, which provide blends of excellent flow properties.

Discussion

The vacuum hopper, as manufactured by the National Rubber Machinery Company, is a closed hopper fitted with a means of applying vacuum and of supplying dry blend to the hopper intermittently from an outside source without loss of vacuum. This supply mechanism is operated by an automatic level-sensing device in the hopper. Figure 1 shows a view of the hopper with the extruder set

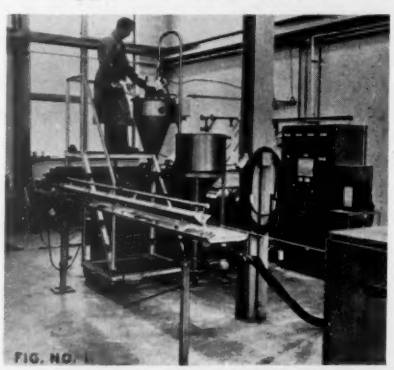


FIG. NO. 1

This paper was presented by Mr. Flathers at the Regional Meeting of Electric Wire and Cable Section of The Wire Association on April 28, 1961, in New York City.

Mr. Flathers holds a B.S. in Chemistry, Boston College 1950; M.S. Organic Chemistry, The Pennsylvania State University 1953; Employment: Vinyl Chemist, Bolta Products Div., General Tire & Rubber Co. 1951-52, 1954-56; Organic Research Chemist, Smith Kline & French Laboratories 1953-54; Technical Service Representative, Escambia Chemical Corporation 1956. American Chemical Society; ACS, Div. of Organic Coatings and Plastics Chemistry; Society of Plastics Engineers; ASTM committee D-20.

Mr. Johnson attended the University of Massachusetts 1946-48; Graduated from Clark University, Worcester, Mass., 1950; Employment: 1950-52, Vinyl Chemist, Southbridge Plastics Inc.; Quality Control Chemist, General Tire & Rubber Company (Pennsylvania Div.), 1952-56; Technical Service Representative, Escambia Chemical Corp. 1956-.

Mr. Pallas, during employment, 1923-1933, attended Western Michigan & Wayne University, Chem. & Chem. Eng.; Subsequent employment: Manager Coatings & Processing Div., Cortland Lime Co., Cortland, N. Y. 1933-1943; Plastics Development Group, Firestone Tire & Rubber Co., Ohio 1943-53; Assistant to Chief Eng., Orchard Industries Inc., Hastings, Mich., 1953-56; Manager Technical Service Laboratory, Escambia Chemical Corporation 1956-. American Chemical Society, Div. of Organic Coatings and Plastics Chemistry, Rubber Group; Society Plastics Engineers; Fifteen patents.

Dr. Smith holds the following degrees: B.S., Va. Mil. Inst., '38; Research Fellow, Alabama, M.S., '41; Ph.D. (Organic Chemistry), Maryland, '46. Cellulose Chemist, Sylvania Industrial Corp., Va., (American Viscose) '38-43; Instructor chemistry, Maryland, '43-46; Senior Research Chemist, Firestone Tire & Rubber Co., Ohio '47-54; Group Leader, Defense Research Division. '54-56; Assistant Director Research & Development, Escambia Chemical Corp., '56-58; Director Research & Development, '58; Vice President, Director Research & Development, '58-. Chemical Society; Institute Chemists; American Management Association; Manufacturing Chemists Association; Society Plastics Industry, Society Plastics Engineer; Sigma Xi. Plastics; polymerizations; petrochemicals; organic reactions.

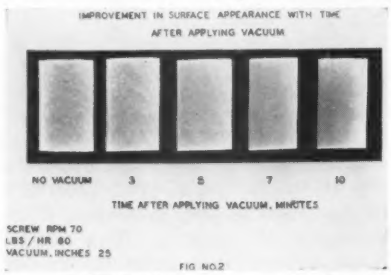
up for insulating wire. All of this work was done with a National Rubber Machinery Model 55, 2½" 20/1 L/D electrically-heated extruder. The screw used was a constant pitch, decreasing depth screw, with a compression ratio of 3.4 to 1, and a 5-flight metering section with a final flight depth of ⅛ inch.

* * *

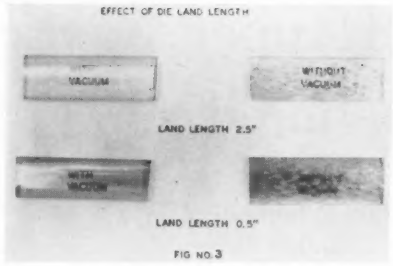
The vacuum hopper has been shown to be effective in the elimination of porosity in the extrusion of high impact polystyrene and PVC dry blends.[4] Previous work in this laboratory [3] has shown in a general way its effectivness in extruding a variety of PVC formulations from dry blend. Formulations ranging from rigid PVC to a weatherstrip containing 90 phr plasticizer and 80 phr filler have been extruded with excellent results.

* * *

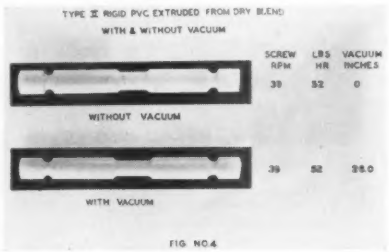
It is of interest to demonstrate some of the general effects of the vacuum hopper in removing porosity and improving surface quality in several non-electrical products. Figure 2 shows the effect of time after the application of the vacuum in improving the surface quality and eliminating porosity from a highly filled weatherstrip formulation. At 57 rpm at a vacu-



um of 25 inches, it required only 7 minutes for the vacuum to become fully effective. Once this quality is obtained in a product, it can be kept indefinitely as long as the vacuum is applied to the hopper. Figure 3 shows the effect of land length on the appearance of clear strip extruded from dies ¼" x 1¼" in cross-section. Note that without the vacuum, strip extruded with a die having a land length of ½" has both porosity and rough surface. That extruded with the die having a 2½" land length has rough surface but no porosity. This difference is prob-



ably due to the fact that the longer land die creates higher stock temperature because of greater restriction to flow. This reduces the melt viscosity and allows air and moisture to come to the surface of the extruded product before it emerges from the die. This results only in rough surface in the extruded product. It is seen, however, that the vacuum is completely effective in producing a flawless extruded product with both of these dies. Figure 4 shows the product obtained in extrusion of Type II rigid PVC dry blend with and without vacuum.



For the study of electrical insulation a formulation typical of high-quality T, TW, 60°C building wire was used. Dry blends were made in a 40 lb. ribbon blender, or a 170 lb. capacity Lee blender. The Lee blender resembles a Hobart mixer. It has a series of inner blades rotating in opposite directions to the main paddle. In the dry blending operation, the resin was added to the blender. Fillers were added through a 6-mesh screen and blended 3 minutes with the resin. Plasticizer was added at room temperature and blended 5 minutes. Steam at 15 to 20 psig was applied to the blender. Lubricant was added after the blend became free-flowing. The end temperature of the blends was generally 215°F. to 220°F. The blend was cooled to 120°F. and stored in plastic bags to prevent moisture absorption.

* * *

Preliminary work involved the extrusion of the dry blends with a ½" diameter rod die, having a ½" land length. Without vacuum, the extruded rod invariably showed porosity and had fair to extremely poor surface quality. Figure 5 shows screw speed versus percent porosity at two different screw water temperatures extrud-

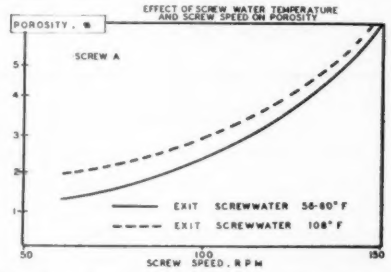


Fig. 5

ing without vacuum. With vacuum, the porosity was eliminated completely under these conditions of screw speed and screw cooling. Figure 6 shows a sample of the rod extruded with and without vacuum at a production rate of 210 to 214 lbs/hr. The output rate was substantially the same with and without vacuum. This has been observed repeatedly with a variety of PVC formulations.

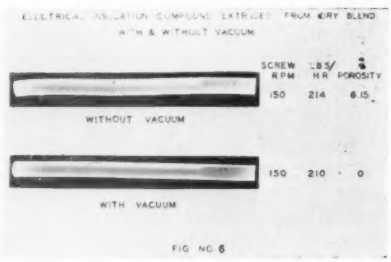


Figure 7 is a plot of the output rate versus screw speed at several degrees of screw cooling with and without vacuum. An indication of

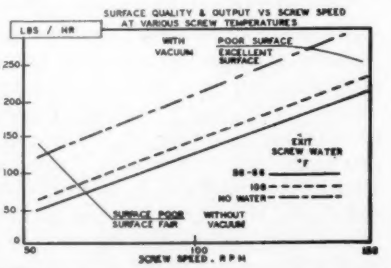


Fig. 7

the quality of the surface with and without vacuum is included. Excellent surface quality and com-

plete freedom from porosity at high rates were obtained with vacuum. Without vacuum, surface quality was fair at best and became poor as screw speed increased only slightly.

* * *

Operating with vacuum at screw speeds higher than 130-140 rpm with no screw cooling water and with heat input to the cylinder and head, the product is rough. With the cylinder heat turned off and the extruder operated adiabatically, the quality of the product improves, but is still somewhat rough. Figure 8 depicts these findings. Based on Figure 7 and Figure 8, it is concluded that for this die, the optimum surface quality and rate are somewhere between the conditions obtained with no screw cooling and those obtained with 108°F. exit screw water, with the extruder operating adiabatically.

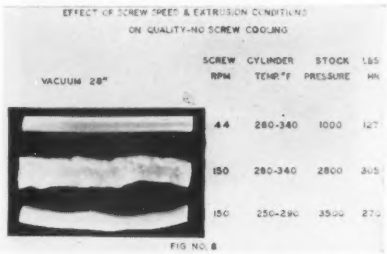


FIG NO. 8

The output rate of an extruder as reported in lbs/hr. does not define the power requirements per unit of product. The results shown in Figure 7 can be shown in a different perspective when plotted as output in lbs./hr./horsepower vs. screw speed. This is shown in Figure 9. It can be predicted that at high screw speeds, the output rate for optimum quality would be between 7 and 10 lbs./hr./h.p. The product extruded adiabatically at 150 rpm, shown as the bottom sample in Figure 8, has an output of 8.9 lbs./hr./h.p.

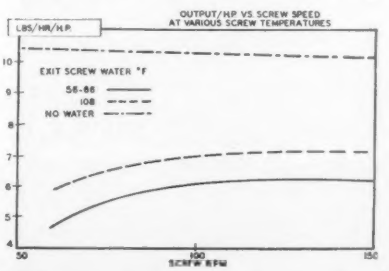


Fig. 9 * * * * * * * * *

The practical use of this type of information can be shown in the actual extrusion of insulation on wire and the evaluation of the properties of the insulation. Using the same formulation, No. 14 AWG wire was coated with a 1/32" thickness of insulation with and without vacuum at several screw water temperatures. The percent retention of elongation of the insulation after oven aging was used as a means of quality. This is one of the most critical physical characteristics of vinyl insulated wire as tested by Underwriters' Laboratories.[5] For this type of insulation, Underwriters' Laboratories specify a minimum retention of elongation of 65% after the insulation has been oven aged for 7 days at 100°C.

* * *

Extrusions were conducted at 57 rpm and at exit screw water temperatures of 65, 85, 150°F. and with no screw water. In all cases, with the vacuum, the insulation was free of porosity and had excellent surface quality. Without vacuum, the porosity ranged from 1% to 5%. Figure 10 clearly shows the value of the vacuum hopper in this case. With vacuum, the percent retention of elongation increases from 70% to 90% as screw temperature increases. Without vacuum, the percent retention is initially very low, rises to a maximum of 80% and declines again to a low value. The increase in per cent retention of elongation at moderate screw temperatures without vacuum is probably due to slight increases of stock temperature. The output in lbs./hr. is also recorded on Figure 10. This serves

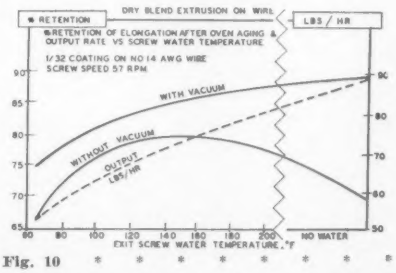


Fig. 10 * * * * * * * * *

to point out that insulation of high quality can be obtained at increased output with the use of the vacuum hopper and proper extrusion conditions. The insulation resistance of the insulation made at the various screw water temperatures with and without vacuum was measured in water at 50°C for 12 weeks. The insulation resistance of the insulation extruded with vacuum was approximately 10% higher than that extruded without vacuum. There was no significant difference in insulation resistance at the various screw water temperatures. The insulation resistance vs. time of immersion is shown in Figure 11 as an average of the values observed for the four conditions of screw temperature.

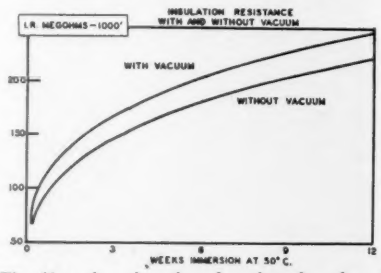


Fig. 11 * * * * * * * * *

The wire speed obtained in the extrusion with vacuum hopper and no screw water as reported in Figure 10 was 250 ft./min. This was done with the extruder equipped with a 15 h.p. drive. More recently, the power of the extruder drive was increased to 30 h.p. and further extrusions on wire have been conducted at higher speeds. At a screw speed of 104 rpm with no screw cooling, wire was extruded at 575 ft./min. or approximately 210 lbs./hr. of compound. The insulation had no porosity, excellent surface and excellent retention of elongation after oven aging, superior to that extruded without vacuum at a wire speed of only 360 ft. per minute, using screw water. Without screw water, acceptable insulation could not be extruded without the use of the vacuum hopper.

* * *

Some problems exist with the vacuum hopper. Perhaps the most serious of these is bridging. Bridging in the hopper can occur with PVC dry blends at vacuum as low as 15 inches depending on the formation. Highly filled, highly plasticized formulations are most prone to bridging. In a given formulation, bridging seems to be dependent on the dry blending technique and the nature of the

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PVC resin. Blends heated to high end temperatures (215-220°F.) generally behave better than those heated to low end temperatures (180-190°F.). Coarse, uniform particle size PVC resins which exhibit large capacity for absorbing plasticizer in the hot dry blending operation provide blends which show better flow under vacuum than fine particle size resins. In electrical insulation formulations, Escambia PVC resins of the 1000 series, eg. PCV 1250-E, produce excellent dry blends. Escambia PVC 2000 and 3000 series resins having large particle size (90% on 80 mesh) are particularly well-suited for vacuum hopper extrusion, especially at high plasticizer levels.

* * *

Certain mechanical methods of overcoming the bridging problem are being investigated in this laboratory and by the equipment manufacturer. In any event, the use of a PVC resin which provides dry blends having the best possible flow properties would appear essential. In addition to flow in the vacuum hopper itself, the flow properties are important in conveying the blend to the vacuum hopper from the supply source.

* * *

It is of interest to describe the properties of certain PVC resins as related to the flow properties of the finished dry blends. The flow properties of PVC dry blends made by the hot dry blending process have been measured by two methods:

1) **Measurement of the time for a given weight of blend to flow through a 60° funnel with a ½" orifice.**
2) **Volume measurement and visual analysis of blend retained on a 5½" diameter plate when a cylinder approximately 4" I.D. by 4" high containing the blend is removed from the plate. Important features are the volume of blend retained, the shape of the retained blend, the angle with the horizontal (angle of repose), and the presence or absence of lumps.**

Resins ranging in dry blending quality have been tested by method 1 in a formulation containing 54 phr DOP plasticizer. The blends were made in a steam jacketed Hobart blender. The flow rate as measured in grams/second vs. the bulk density of the blend is shown in Figure 12. The flow rate generally increases as the bulk density of the dry blend increases. The bulk density of the blend in turn is related to the nature of the resin. Escambia PVC 1250-E, an electrical grade resin, produces blends of excellent flow properties. PVC 2250, trade named "Pearl" resin, produces blends of even greater flow rate. This resin is characterized by large uniform particles and has the ability to absorb high levels of plasticizer in

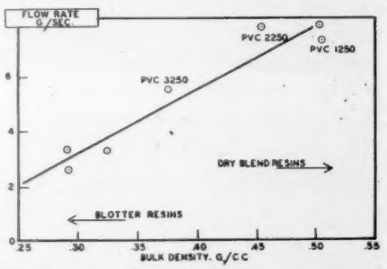


Fig. 12

(*Please turn to page* 809)

TABLE I

RETAINED VOLUME
PVC DRY BLENDS - POLYMERIC PLASTICIZERS

PLASTICIZER LEVEL PHR	TYPICAL DRY BLEND RESIN	ESCAMBIA PVC-1250-E	ESCAMBIA PVC-2250	ESCAMBIA PVC-3250
		RETAINED VOLUME, CC.		
	POLYESTER PLASTICIZER - MOL. WT. 2200			
50	280	275	250	255
70	355	285	265	300
100	370	360	350	325
	POLYESTER PLASTICIZER - MOL. WT. 8000			
50	350	315	265	280
70	375	330	275	285
100	No flow	No flow	No flow	325

Wire Insulating by the Fluidized Bed Process

by C. A. Brown
Engineering Research Center
Western Electric Company
Princeton, New Jersey

This paper was presented at the Regional Meeting of the Electric Wire and Cable Section of The Wire Association on April 28, 1961, in New York City. Due to the inability of Mr. Brown to be present it was read by Dr. E. J. Shaw.

The purpose of this paper is to consider the fluidized bed coating process as applied to wire insulating. This method of coating is a relatively new process and is in its infancy as far as the technology of powder formulation, manufacture and application are concerned.

* * *

Fluidized bed processes are not new to industry, since they have been used in chemical reactions, ore treatment, casting, and now plastic coatings.

* * *

During the past couple of years there has been considerable interest in the fluidized bed coating process, as evidenced by the publications in the technical literature, and the process' growing use in dip coating. Western Electric, naturally, has an interest in a new technology and the fluidized bed process for dip coating has been investigated. We are now investigating its application to wire insulation. The possible advantages that we foresee for this process are as follows:

1. Coating of multiple number of wires.
2. Simplification of equipment and lower cost.
3. Lower labor cost.
4. Multiple layer coating of different polymers.
5. Tandemization with slow speed operations.

* * *

The fluidized bed technique consists of heating an object to be coated to a temperature above the melt and flow point of the plastic . . . immersing the object in a bed of air-suspended plastic powder which resembles a gently boiling liquid when properly fluidized (Figure 1) . . .and, after removing it, subjecting the coating to more heat to fuse the adhering plastic particles into a continuous coating. The fluidization of the coating material is achieved by providing an ascending current of air in a tank

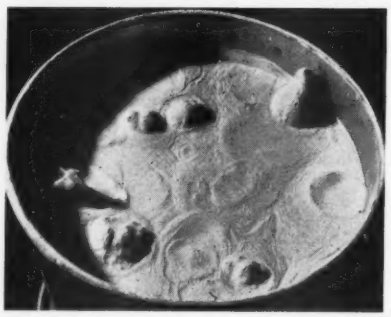


Fig. 1 * * * * * * * *

containing the coating material. When the object to be coated is introduced into the fluidized bed, the plastic powder sinters together on the hot surface of the article and forms a coating.

* * *

To date, our experimental work on investigating the fluidized bed process for wire insulating has followed three stages. First, we performed a series of dip coating experiments both with panels and short pieces of wire, and we found that it was possible to produce reasonably good coatings. Our next step was to assemble a vertical wire coating apparatus (Figure 2) to demonstrate that plastic insulations could be applied using this method. The copper wire was heated by passing it through a high frequency induction heating coil immersed in the fluidized bed of plastic powder. This may be significant because the smoothest coatings obtained to date were produced under these conditions. The small gage wires with which we have been working have very low mass and lose heat so rapidly when heated externally to the fluidized bed that the heat loss may affect the quality of the coating. In our present pilot line, which I will describe, the wire is heated before immersion.

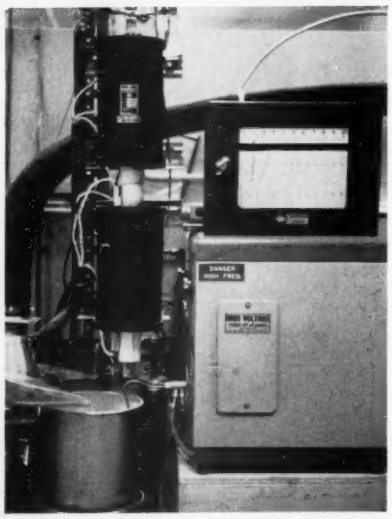


Fig. 2 * * * * * * * *

The latest step in our investigation has been to determine what increase in speed could be achieved, as well as to assess the feasibility of multiple-layer coatings. A horizontal wire line was constructed so that a greater length for coating and fusion could be provided.

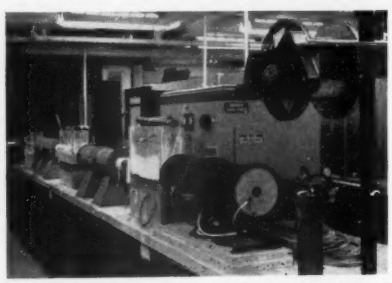


Fig. 3 * * * * * * * *

The pilot line (Figure 3) has a pay-off reel from which the wire is dereeled and passed into the preheat furnace, where it is heated to about 400°F. A high-frequency coil conductor preheat between the furnace and the fluidized bed raises the wire temperature to about 600°F before it enters the bed

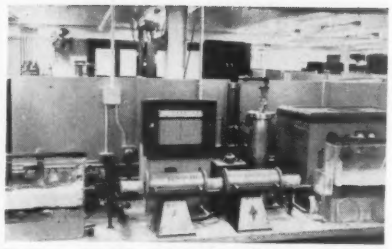


Fig. 4 * * * * * * * *

(Figure 4). Natural polyvinyl chloride approximately 100 to 200 mesh is in the first bed. The powder is fluidized by air passing up through a porous stainless steel plate at about 50 psi and 1 cfm. The plastic particles bubble up and around the heated wire, fusing and flowing into a continuous coating as they touch. The coated wire is then post-heated, thus completing the fusion process. The wire then passes into the second fluidized bed, which may contain a different type of polymer and may be colored where new particles adhere to form a second coating. Figure 5 shows another tube furnace which completes the fusion of the second coat. The insulation is then cooled in water and the wire taken up on a reel. Between the cooling tank and the take-up is a tiny motor with a block of Teflon on the shaft which lightly vibrates the wire to remove excess powder from the wire as it emerges from the fluidized beds.

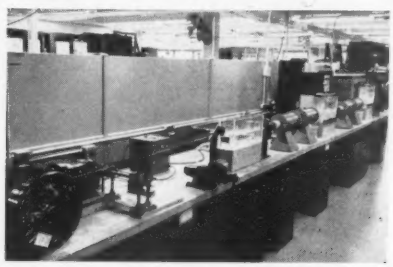


Fig. 5 * * * * * * * *

Our experiments on the above pilot line indicate that we accomplished our immediate objectives to determine that higher speeds are practical and that multiple layer coatings with different polymers are feasible.

* * *

As might be suspected, we have found that the size and shape of the powder particles greatly influence the fluidization of the powder and the quality of the coating. Probably the most useful method of examining these particles is by projecting a 75X magnified shadow of the particles on high-contrast enlarging paper, which is then developed. This technique provides a record of each material mixed or received, and it is possible to study and compare various materials.

* * *

In general, a particle approximately spherical in shape (Figure 6) will fluidize best. Conversely, a powder with irregularly-shaped large, shredded particles (Figure 7) does not fluidize satisfactorily. Such particles become interlocked and cannot move freely.

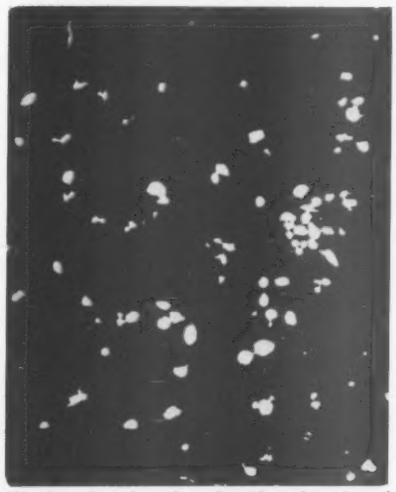


Fig. 6 * * * * * * * * *

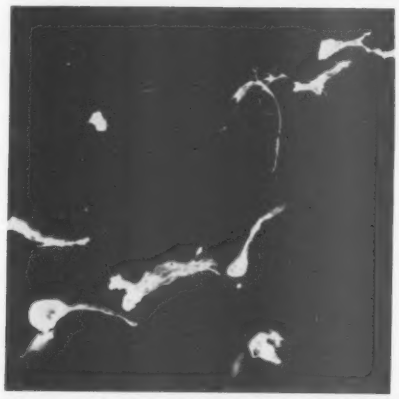


Fig. 7 * * * * * * * * *

We have also observed that to obtain smooth, thin wall coatings 10 to 15 mils in thickness, it is necessary to have a small average particle size. Shipments of the same type of plastic powder received on two separate occasions differed widely in the quality of coatings they produced. This fact puzzled us until we found that the average particle size in the one shipment was considerably larger than that of the other. Figures 8 and 9 point up this contrast, but this is only one criterion of a good coating material.

Fig. 8 * * * * * * * * *

Fig. 9 * * * * * * * * *

A screen analysis of a satisfactory material (Figure 10) is as follows:

Mesh Size	*Size Opening*	*Percent Retention*
120	.0058 in.	35
140	.0049 in.	15
170	.0041 in.	12
270	.0035 in.	26
Pan	.0021 in.	12

* * *

A number of thermoplastic and thermosetting resins are suitable for fluidized bed coatings; however, our work has been confined to the polyolefins and vinyls which we use for plastic wire insulation. Polyvinyl chloride seems to have an advantage over polyethylene in producing smooth coatings.

* * *

Powder-mixed vinyls without

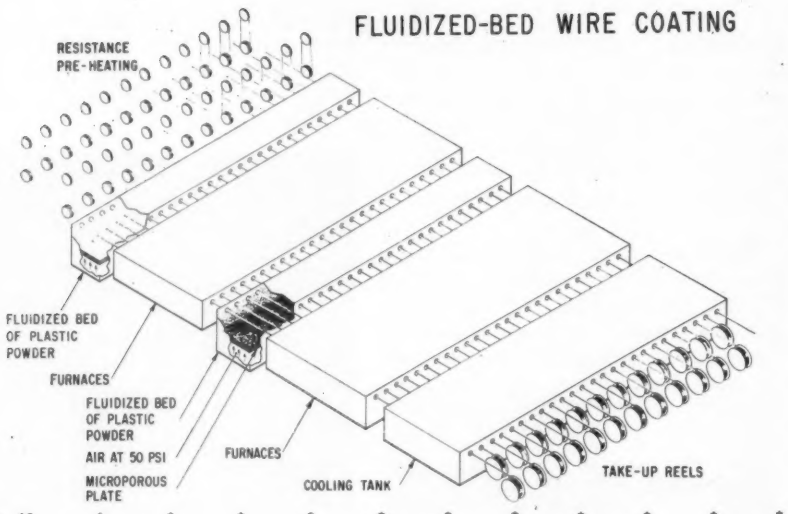


Fig. 10

fillers should be satisfactory and are more economical to produce than fluxed and pulverized material and have the added advantage of less heat degradation. Small amounts of lubricants and increased plasticizer concentration promote fusion and flow of the coating material.

* * *

The following results were derived from physical tests on 19 gage B.S. copper wire insulated with a polyvinyl chloride compound by the fluidized bed process.

	Typical Wire Requirements	*Results*
Compression	500 lbs. (minimum)	430 lbs.
Elongation ASTM D470	150 pct (minimum)	170 pct
Elongation Aged 48 hours at 100°C	50 pct (minimum)	140 pct
Heat Distortion ASTM D734	Less than 50 pct	14 pct
Wrap Test at 0°F (¼ in. mandrel)		O.K.
Shrinkback at 120°C (1 hour)	Less than 16/64	0 in.
Adhesion	Less than 8 lbs.	5.76 lbs.

* * *

* * *

Polyethylenes satisfactory for wire insulation have a low melt index, and the melt index, which is a measure of the fluidity of polymers under low shear rates, has been generally used as a basis for comparing the relative flow characteristics of polyethylene resins. We have obtained satisfactory coatings with the higher melt index polyethylene materials; i.e., above 3, but these are not usually considered satisfactory for wire insulation.

* * *

A potential advantage of the fluidized bed process over that of extrusion is its ability to coat many wires at one time. We have envisioned a process that would, by a series of coating tanks and ovens, continuously coat 100 wires. This is essentially a slow speed process, but it is within practical considerations to assume speeds up to a few hundred feet a minute on small gauge, thin-wall insulations.

* * *

We are not necessarily suggesting that this can be a substitute for extrusion, but it may find its niche in the wire industry, particularly as a process that can easily be tandemized with other slow speed operations. In the field of specialty wires it seems to offer some unique advantages in that composite coatings of one or more polymers are possible, and pigmentation, with its cost and lowering of electrical properties, can be consigned to the outer layer.

FUTURE MEETINGS Scheduled for THE WIRE ASSOCIATION

June 22-23, 1961

West Coast Regional Meeting of the Association at the Jack Tar Hotel, San Francisco, Cal. Plant inspection trip will be to Bethlehem Steel Company's South San Francisco Works.

October 22-25, 1961

Annual Convention of the Association at the French Lick-Sheraton Hotel, French Lick, Ind.

October 22-25, 1962

Annual Convention of the Association at the Lord Baltimore Hotel in Baltimore, Maryland. Plant visits to Bethlehem Steel Company's Rod & Wire Mills at Sparrows Point and to Western Electric Company's Point Breeze Works are scheduled.

Note these dates on your calendar for future reference.

THE WIRE ASSOCIATION

RICHARD E. BROWN
Executive Secretary

453 Main Street, Stamford, Conn.
DAvis 3-0482

Establishing A Tape Standardization Program

by Robert W. Pallett*
Senior Industrial Engineer
Electrical Wire Division
John A. Roebling's Sons Division
The Colorado Fuel & Iron Corporation
Trenton, New Jersey

As anyone manufacturing a broad line of electrical cables well knows, a great many types and widths of tapes are required to meet the various product requirements. In addition, many pad sizes are required to fit the different types and makes of taping heads. Without adequate standardization and control, these two facts coupled with the large variety of tapes on the market and the wide latitude the cable design engineer often has in his choice of the type of tape, width of tape and method of tape application can lead to a great hodgepodge of tape types, widths and packages.

* * *

This article is essentially an outline of the steps we took at the Electrical Wire Plant of John A. Roebling's Sons Division of Colorado Fuel and Iron Corporation to standardize and control our taping practices. This was a long and tedious process, but well worth the effort in terms of the benefits gained, such as:

1. **Reduced inventory and purchasing costs due to reduced number of inventory items.**
2. **Reduced product costs due to the use of less expensive materials and/or less expensive methods of application without compromising quality.**
3. **Reduced time and effort in cable design and preparation of standard manufacturing practices due to stabilized, precalculated taping designs.**
4. **Improved product quality and fewer rejections due to improved types of tapes.**
5. **Reduced maintenance of incentive rates due to standardized taping practices.**

* * *

This program like any standardization program was necessarily a joint effort involving Product Engineering, Process Engineering, Industrial Engineering, Production Planning, and Shop Foremen and Venders. However, our Product Engineering Department carried the burden of the effort in determining the standard tape applications and setting up standard taping practices. The Process Engineers checked out and approved the new tapes and the Industrial Engineering Department pushed for cost reduction and did much of the expediting. Through it all, the Production Planning Department struggled bravely with all the changes upon changes that were made before the program was finalized.

* * *

I must confess that the outline of the program which follows is actually an idealized situation. Although we followed all the steps as outlined, we did not necessarily follow them in the proper seqence and found ourselves back-tracking in many cases. My advice to anyone contemplating such a program is to start from the beginning and follow it all the way through. There are no shortcuts to thoroughness. Here are the steps:

A. **Select the least expensive tape and method of application for each product.**
B. **Set up standard taping practices by product diameter.**
C. **Minimize the number of pad sizes required.**
D. **Set up master tape charts.**
E. **Set up a definite procedure to follow when changing to new types of tapes or new package sizes.**

* * *

Notice that although the steps as outlined are written specifically for tapes, the principles behind these steps will apply equally well to any type of material. Now for the details.

A. Select the Least Expensive Tape and Method of Application For Each Product

1. **Prepare** tables of tape costs on a comparable basis. Tape costs can best be compared per unit of area covered. Rather than use the conventional but abstract cost per 100 square yards, we used costs per 1000 ft. of 1" wide tape so that tape costs could be more quickly related to costs per 1000 ft. of cable. See Sample Table I attached.

* * *

The thickness of the tape also has an effect upon cable costs since the thickness of the tape will affect the cable diameter and thus affect the amount of materials applied over the tape. The effect of tape thickness on costs must be calculated separately for the particular products involved in cases where the tape thickness appears to influence the choice of tapes.

* * *

2. **Calculate** comparable costs for alternate methods of application and alternate taping machines. In

Robert W. Pallett

This paper was presented at the Regional Meeting of the Electric Wire and Cable Section of The Wire Association on April 28, 1961, at New York, N. Y.

The author graduated from Oklahoma A.&M. College (now Oklohoma State University) in 1950 with a B.S. in Industrial Engineering. He joined Roebling the same year and later was made head of the Industrial Engineering Department of the Electrical Wire Division.

*** Since the paper originally was written he has joined the Reynolds Metals Company as plant industrial engineer at the Chester, Pennsylvania, plant.**

SAMPLE TABLE I SEMI-CONDUCTING TAPES

Tape Description	Thickness	Sheeting	Pounds per 100 Sq. Yds.	Lbs. per 1000' 1" Wide Strip	Std. Cost Per Cwt	Std. Cost per 1000' 1" Wide Strip	Tapes Stocked
Tape A	.0045	68x72	20.00	1.86	$285.00	$5.31	Yes
Tape B	.006	56x56	28.57	2.64	201.00	5.31	Yes
Tape C	.010		23.98	2.22	175.00	3.89	No
Tape D	.012		36.56	6.11	125.00	7.64	No
Tape E	.0045		15.44	1.43	596.50	8.53	No
Tape F	.0045	64x60		1.71	248.00	4.26	No
Tape G	.004		13.50	1.25	385.60	4.82	No

SAMPLE TABLE II STANDARD RUBBER FILLED CABLE TAPING CHART

Diam. Under Tape	Width Inches	Overlap Inches	Angle Deg. Min.	Length of Lay Inches	Helical Wrap Factor	Ft. of 1" Tape per 1000 Ft. of Cable	Pounds SFRF Tape per 1000' Cable
626-635	2	1/4	30-13	3.48	1.158	2320	10.16
636-645	2	1/4	31-34	3.35	1.175	2350	10.29
646-655	2	1/4	33-4	3.20	1.193	2390	10.47
656-665	2	1/4	34-24	3.10	1.212	2425	10.62
666-675	2	1/4	35-20	3.01	1.230	2460	10.77

the absence of incentive rates or actual cost data, comparable costs for alternate machines can be obtained by dividing the labor costs per minute by the rpm of the taping head and adjusting for any differences in pad sizes or reel lengths. Do not overlook the possibility of eliminating separate taping operations by applying tapes longitudinally, or adding taping heads to existing processing machines.

* * *

3. Develop product design and processing data relevant to taping. This data is based not only on customer and industry specifications, but on industry practices and processing limitations in the shop.

a. Which products require double faced rubber filled tape rather than single faced tape?

b. Should tapes be dusted, and if so, what type of dust should be specified?

c. Can tapes be applied longitudinally instead of helically?

d. Can a less expensive grade of tape be used without compromising quality?

e. Can a different type of tape be used?

f. Can tapes be eliminated from certain products entirely by a less expensive cable design or following a customer's option.

* * *

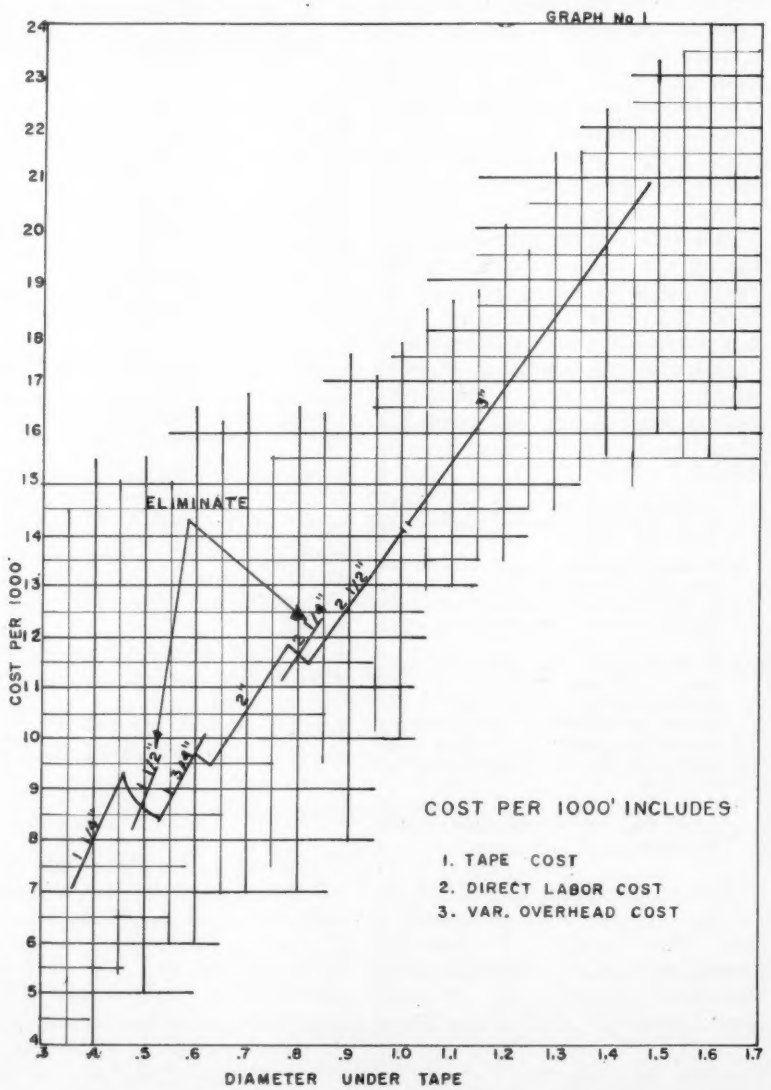
In connection with point "b" above we had quite a problem in that the standard rubber filled tape which we purchased could not be run on our taping machines unless it were dusted with talc. This was unsatisfactory as it led to processing difficulties. Another dusting material, namely, zinc stearate was tried but this also proved unsatisfactory. The problem was not solved until the tape manufacturer developed a dry tape that would run on our machines without dusting.

* * *

4. Armed with comparable costs of the various types of tapes, costs of the various means of applying the tapes and pertinent design and processing data, the type of tape and means of application should be specified for each product line. Unless sales policy dictates otherwise, the type of tape and method of application chosen should minimize the cost of tape and taping per unit of cable without compromising quality.

* * *

We set up separate sheets for each type of tape and listed the approved product applications on these sheets. These sheets were approved by the Industrial Engineering Department, Product Engineering Department, Process Engineering Department, Planning and Scheduling Department, and



SAMPLE TABLE III — MASTER LISTING OF TAPE WIDTHS

	Machine	Pad Size	Colors	Wire Sizes For Tape Widths								
				3/4	1	1-1/4	1-1/2	1-3/4	2	2-1/4	2-1/3	3
18 x 5-1/2" Pad												
Product A	283	18x5-1/2"	Black			4-2		2/0	4/0			
Product B	209	"	"	8-1/0	2/0-900	1,000						
Product C	209	"	"		4-500	600-1,500						
Product D	209	"	"		4-300	300-1,500						

ELECTRICAL WIRE DIVISION - INVENTORY CONTROL Date_____ No._____

AUTHORIZATION FOR STOCKING NEW RAW MATERIAL SUPERSEDES PRESENT INVENTORY ITEM
ADDITIONAL INVENTORY ITEM

The person requesting the stocking of new material is responsible for obtaining answers to this questionnaire before submitting questionnaire for approval.

	NEW MATERIAL	SUPERSEDED MATERIAL
Name of Material		
Purchasing specifications		
Yield (Lbs./100 yds. ^{2} S.G., etc.		
Cost per purchasing unit		
Cost per unit volume or coverage		
Cost to be used for standards		
Put-up (O.D.-I.D., container, etc.)		
Lead time		

Reason for requesting new inventory item(s)

Product specifications material meets (IPCEA, ASTM, etc.)

Are materials obsoleted? ___. Should the present stock be used up before changing to the new material? ___. If not, fill out attached sheets). Can package or machine be altered so that material can be used on more than one machine? ___. Explain:

Are incentives affected? Explain:

List products effected and material sizes and quantities to be ordered: (Attach separate sheet showing this information.)

Requested by _____ Date _____

Product Engineer	Purchasing Section
Process Engineer	Planning and Scheduling
Chief Electrical Engineer	Superintendent
Industrial Engineer	Manufacturing Manager

the Superintendent of Production. They were then distributed so that the same tapes would be specified and used on special products as are used on standard products for a similar application.

B. Set Up Standard Taping Practices by Product Diameter

The first step toward setting up taping practices is to determine tape overlaps and minimum taping angles. In accordance with Underwriter, NEMA — IPCEA, and ASTM specifications, we adopted standard overlaps as follows:

Tape Width	*Overlap*
¾"	⅛"
1"—2¾	¼"
3"	⅜"

* * *

A minimum taping angle of 35° was used in the original standards. However, the angle was reduced to 30° at a later date in order to eliminate 2 tape widths.

* * *

Standard taping tables were set up by diameter ranges in 10 mil increments. See Sample Table II attached. These basic tables were extended into pounds and then cost of tape per 1000 ft. of cable for each diameter range. In addition, taping direct labor and variable overhead costs per 1000 ft. of cable were calculated for each diameter range. Tape costs, direct labor costs, and variable overhead costs per 1000 ft. of cable were totaled for each diameter range and plotted on the attached Graph #1.

* * *

The prime object in plotting costs was to see if any tape widths could be eliminated without sacrificing costs.

* * *

As indicated on the graph, the 1½" and 2¼" widths were eliminated. This was accomplished without increasing the average cost over the diameter range by extending the ranges of the adjacent tape widths. In order to maintain a minimum taping angle of 30°, the tape overlap had to be increased when the use of the wider tape was extended to smaller diameter cables; however, the faster running speed of the wider tape tends to offset the cost of the increased overlap.

* * *

Taping specifications were then determined for each product size.

C. Minimize the Number of Pad Sizes Required

Prior to the tape standardization program we were purchasing separate pad sizes for practically all machines. We decided to purchase 1 or 2 standard pad sizes and furnish inexpensive inserts for the taping heads so that they could run a standard pad size. In our case the standard pad sizes chosen were 5½ x 18 and 3 x 12.

* * *

Since we had to choose a standard pad size with the largest inside diameter and the smallest outside diameter we were immediately concerned with the increased labor cost

(*Please turn to page* 805)

Regional Meeting of the Electric Wire and Cable Section of The Wire Association

by Edmund D. Sickels, Editor
Wire and Wire Products
Stamford, Connecticut

The third annual Regional Meeting of the Electric Wire & Cable Section of the Association was held in New York City on April 27 and 28, 1961, at the Sheraton-Atlantic Hotel. 318 persons registered for the meeting.

* * *

Two business meetings were scheduled for the preceding day, April 26 — that of the Board of Directors and the Electric Wire & Cable Management Committee.

Board of Directors Meeting

Raymond S. Worth, President of the Association, called this regular semi-annual meeting to order at 10 o'clock on April 26. Following the roll call, Mr. Worth called upon **Richard E. Brown,** Executive Secretary and Treasurer, to read the minutes of the preceding meeting and the Treasurer's Report for the period from October 1, 1960, to April 1, 1961. Both reports were duly approved as read.

* * *

Dartrey Lewis, Chairman of the Awards Committee, reported that his committee had selected the following 1960 papers and authors for awards: **Gilbert D. Dill,** Consultant on Blast Cleaning and Materials Handling, Mishawaka, Ind., the Ferrous Division Medal Award, for his paper, "An Economic Analysis of Acid Pickling vs. Multiple Strand Blast Cleaning of Wire"; in the Non-Ferrous Division, the Medal Award was recommended for **Robert C. Lawrence, Jr.** Chemical Products Corp., East Providence, R. I., for his paper "Vinyl Plastisol—A Versatile Material for Insulating Wire and Encapsulating Wire Harness Constructions"; in the Ferrous Division, a Certificate of Honorable Mention will be awarded to **Kenneth P. Brown,** Commodity Specialist, Pacific Metals Co. Ltd., Los Angeles, Cal., for his paper "The New Nickel Alloys in Wire for Special Applications"; and in the Non-Ferrous Division, a Certificate of Honorable Mention was awarded to **David Barr,** Plant Engineer, National Electric Div., H. K. Porter Co., Ambridge, Pa., for his paper "Installation of a Semi-Automated TW Wire Extrusion, Coiling and Boxing Facility in a Medium Sized Wire Plant". The selections for awards were approved by the Board.

J. K. Gillett
Program Chairman

The high lights of the meeting of the Board of Directors is covered in this story of the Regional Meeting of the Electric Wire and Cable Section. The report includes the names of the authors and papers that were approved by the Board for awards to be presented at the Annual Convention.

* * *

Allan B. Dove, Chairman of the Board of Past Presidents, was called upon to name the Mordica Memorial Lecturer for 1961. He announced that **David M. Schmid,** President of the Techalloy Company, Rahns, Pa., had been invited to present this Lecture and had accepted the honor.

The Executive Secretary, reporting for **William Mohr,** stated that the West Coast Regional Meeting would be held at the Jack Tar Hotel in San Francisco on June 22-23, with a technical session, a dinner and a plant inspection tour of Bethlehem Steel Company's South San Francisco Works Bolt Department.

* * *

J. K. Gillett reported that the Electric Wire & Cable Section's Regional Meeting on the next two days would incorporate a plant tour of the Bell Telephone Labratories in Murray Hill, N. J., and a Hospitality Hour on Thursday, and that on Friday two technical sessions would hear nine fine papers.

* * *

The directors authorized the holding of a similar meeting in 1962 at Worcester, Mass., with a plant visit to the Electric Cable Works of the American Steel & Wire Division of United States Steel Corporation.

* * *

John L. Sanderson, General Program Chairman for the 1961 Annual Convention, reported that transportation to French Lick, Ind., could be by rail or air, the latter to Louisville, where busses or air taxis would be available to reach the hotel. He suggested that persons attending plan to arrive on Sunday. Because of there being no plant tour, a new scheduling of events was proposed with the afternoon of October 25 open for whatever the members would like to do by way of recreation. He recommended that the Convention close following breakfast on October 26.

* * *

Norman T. Nelson, Jr., who will serve as General Program Chair-

man in 1962, reported that the success of the last boat ride from Baltimore to Sparrows Point was so well received that it will be repeated for both the Ferrous and the Non-Ferrous Divisions, busses meeting the boat to take visitors to Bethlehem Steel's Wire Mill and Western Electric's Point Breeze Works. **J. E. Donnellan** reported on the facilities at the Lord Baltimore Hotel, particularly with reference to exhibit space.

* * *

Messrs. John H. Corson, W. R. Moyers and **Charles M. Fredrickson** (the last report given by Mr. Lawson) each reported on the status of papers for the three sections of the 1961 Convention, all of which were very well developed at this point.

* * *

Urbain J. H. Malo recommended that the Questionnaire Committee, of which he was Chairman, be dissolved. He discussed at some length his recommendations to the By-Laws Revision Committee and his recommendations were referred to that Committee for consideration.

* * *

Allan B. Dove, Chairman of the By-Laws Revision Committee, requested all directors to submit suggestions and said he had arranged for a page notice in WIRE AND WIRE PRODUCTS calling for suggestions from members.

* * *

President Worth announced that he had appointed the following men to committees for reports to be made in October: Nominating Committee for Directors: **Walter B. McShane,** Chairman, and **W. R. Moyers** and **R. W. Higginbottom,** members; Nominating Committee for Officers: **J. C. Murray, Jr.,** Chairman, and **Theodore B. Dull** and **William Mohr,** members; Nominating Committee for the Executive Committee: **Earl R. Potter,** Chairman, and **U. J. H. Malo** and **Marshall V. Yokelson,** members.

* * *

Richard E. Brown called attention to an offer from **Charles E. Youngblood** of Bethlehem Steel's Johnstown, Pa., plant, to write a book on steel wire processing. Mr. Youngblood was described as a very able technician and several suggestions were made, all of which will be taken under consideration by the Executive Committee, to which it was referred.

* * *

An offer to assist in the formation of a Wire Product Forming and Fabricating Section resulted in a decision to defer action on it to a later date.

* * *

It was proposed that a memorial notice on the passing of **Sidney Rolle** be published in Wire and Wire Products, which was duly approved.

* * *

A motion to approve the actions of the officers and directors for the period of September 30, 1960 to April 1, 1961, was made and unanimously passed.

Electric Wire and Cable Management Committee Meeting

This meeting was called to order at 2:00 P.M. by Chairman **Clement C. Lawson.** Following a discussion of the minutes of the previous meeting, the minutes were approved as written.

* * *

Mr. Malo reported for **David Barr,** Chairman of the Membership Committee, that the terms of office of the Management Committee should be so scheduled that eight would be retiring each year. Retirement of **Harold W. Adams, R. W. Higginbottom, J. C. Murray, Jr., H. S. Spaulding, R. T. Stafford** and **M. V. Yokelson** was announced. New appointments and reappointments for three year terms were announced by Chairman Lawson as follows:

Reappointments

David Barr
Grover W. Brown
Charles M. Fredrickson
James S. Higgins
Alexander A. Kerr
Clement C. Lawson
Urbain J. H. Malo
W. R. Moyers
David M. Schmid

New Appointees

Elmer J. Goetz, Genl. Mgr.
Federal Wire & Cable Co. Ltd.

Gordon C. Rollins, V. P.—Mfg.
Superior Cable Corp.

J. J. Dowling, Pres.
Philadelphia Insulated Wire Co.

Harry E. Thompson
Consulting Cable Engineer
Anaconda Wire & Cable Co.

Walter E. Dahlstrom, Chief Res. Eng.
American Steel & Wire Div.
United States Steel Corp.

All other members whose terms have not expired will continue to the end of their terms, there now being 23 members in all.

* * *

Mr. Moyers reported on the problems involved in securing the nine papers for the Electric Wire and Cable Meeting and canvassed the members present for assistance in completing the papers that will be needed for the 1961 meeting.

* * *

Mr. Higgins, Chairman of the Papers Review Committee, urged that papers be gotten in sufficiently ahead of the meetings to provide more time for review. He also called attention to the need for revising the rating forms and was requested to submit his suggestions in this connection to the Management Committee.

* * *

Mr. Malo made a verbal summarization of his report to the Board of Past Presidents and reported on the action taken by the Board of Directors in the morning. It was suggested that a letter be sent to all electric wire companies to secure ideas on what would make the Electric Wire and Cable Section more interesting and valuable to their mill men, and he was asked to appoint a committee to draft such a letter.

* * *

Mr. Gillett, Program Chairman of the 1961 Regional Meeting, read a report on the status of the meeting and stated that he expected that it would show a reasonable surplus over expenses.

* * *

Mr. Lawson reported that the Committee had been assured of a plant visit to American Steel & Wire's Electric Cable Works in Worcester and that pending arrangement for hotel facilities, the meeting could be scheduled for some time in April or May in 1962. Providence was suggested for 1963 and Buffalo in 1964.

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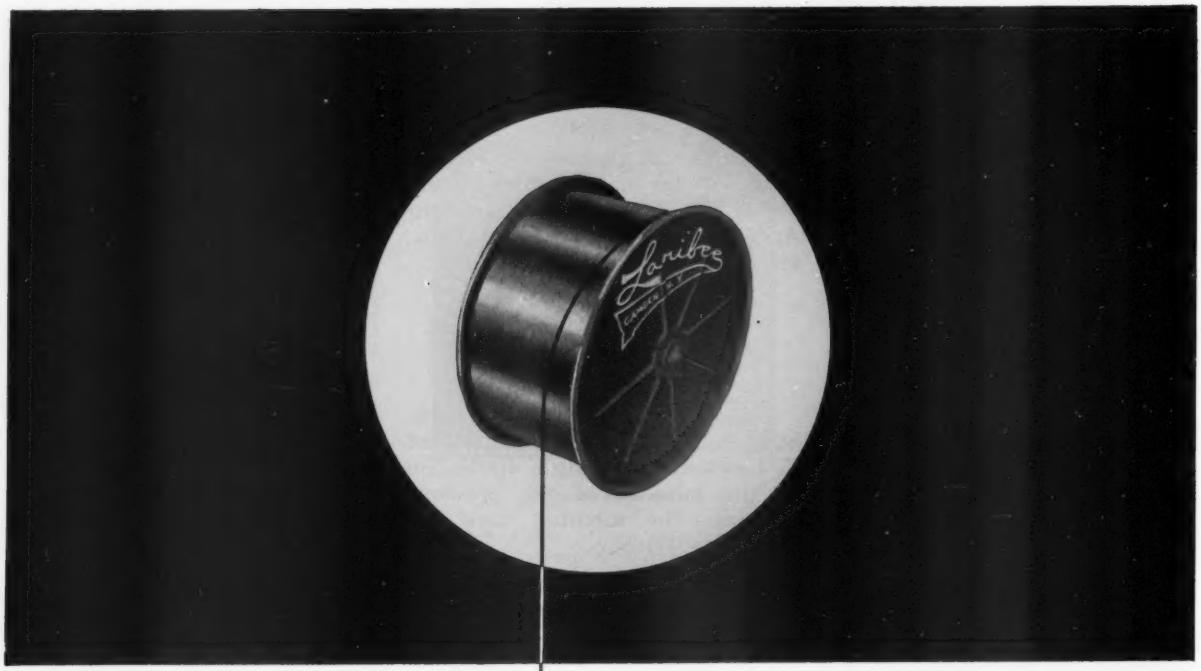
Dependability Plus Quality



For flawless extrusion, our quality controls permit us to meet precision tolerances and guarantee to you a wire of constant diameter and tensile strength.

AND, what's just as important to you, our order service department will get your wire to you when and as you need it. You can be sure if it is LARIBEE Wire!

FABRICATORS OF THE FINEST COPPER WIRE AVAILABLE

Solids . . . Stranded . . . Braid . . . Bunched . . . Cables . . . All bare or tinned

LARIBEE WIRE, Inc.

CAMDEN New York CAmden 42

New Installation for Preparation of Steel Blanks for Cold Forging

by Dr. Ing. H. D. Feldmann
Technical Director
Cold Forging Limited
Sunbury-on-Thames
Middlesex, England

The interest in cold forging as a method of producing parts from rod, bar and wire, makes this description of a new English installation timely and informative.
The author has had long experience in cold forging and is the author of the only book solely devoted to cold forging.

An installation that will produce continuously and automatically, steel blanks of uniform mass and shape has been designed and developed by our company, a member of the Camp Bird Group.

* * *

Three distinctly separate operations may be carried out including cropping from barstock, flattening or preforming of the cropped blank and deburring or chamfering of the inevitable cropping burr. The three units, which are included in their series of machines—marketed under the name COLFORG—are linked to one another by a mechanical conveyor belt which feeds the blanks from one unit to the next.

* * *

The compact and versatile plant prepares steel blanks suited for mass production of components by, for example, the Colforg method which has been developed at our plant and our international associates is a complete system devised to handle raw material at speed through the various cold forging operations. The machine shown in Fig. 1 is installed at the Company's works at Sunbury-on-Thames. It is completely automatic except for placing the bars of raw material on the barstock feeder.

* * *

In designing the equipment, attention was paid to introducing the unit-construction principle wherever possible to enable the potential customer to buy a plant "made to measure" to his own requirements, although it consists of standard parts. This applies not only to individual machine components but also to some of the machines themselves, e.g. to the cropping machine.

The cropping machines are made in three sizes capable of handling barstock of 1, 2 and 3 ins. diameter respectively. However, in the interests of overall operational efficiency it may be desirable to use the cropping machine with a special tool which will also carry out the flattening operation. The power required for flattening blanks of a given diameter is substantially greater than that required to crop barstock of the same cross-section. Therefore the cropping machine can only be used to crop and flatten material of a smaller cross-section than the maximum rating of the cropping tool.

* * *

The barstock feeder for the machines is a standard unit, irrespective of whether the machine operates exclusively as a cropper or combination flattening cropper. The individual bars are placed on an inclined bed fitted with rails, on which a carriage runs. This is attached by wire eable to a drum operated hydraulically. The front of the carriage engages the end face of the steel bar so that when tension is applied to the rope, a positive feed is applied to the bar which is moved successively into the cropping tool, at the operating rhythm of the machine. The hydraulic system is under permanent constant pressure, also when the bar has been advanced against the

(*Please turn to page* 797)

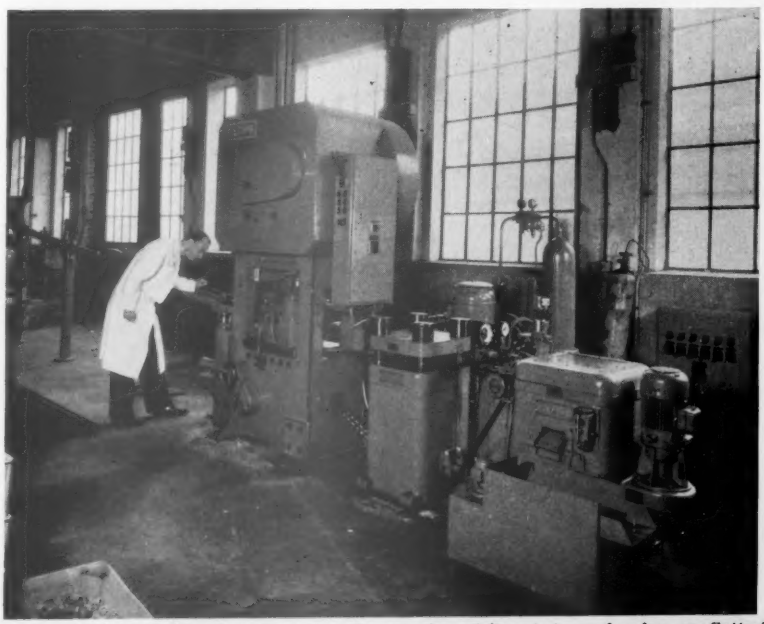


Fig. 1 — Photograph showing the automatic cropping (left-centre), preforming or flattening (centre), and chamfering (right) installation at the Sunbury works of Cold Forging Ltd.

New Packaging System for Prestressed Concrete Strand Developed by Roebling

New methods of packaging wire are making their debuts constantly all adding to efficiency of handling and processing. Roebling's contribution to the trend has taken the form of the new system for pulling up strand for the greater convenience and cost savings of the customers for this product.

A new packaging method has been developed by **John A. Roebling's Sons Division,** the Colorado Fuel and Iron Corporation, for use in conjunction with prestressed concrete strand.

* * *

The package is of significant importance, since it makes possible a reduction in the selling price of Roebling 7-wire, stress-relieved strand used as the tensioning element in prestressed concrete structurals. In addition to the price break-through, the new packaging system has a labor-saving advantage for fabricators in that the reels are replaced in racks 30% fewer times—standard lengths per package have been increased to 12,000 ft., 16,000 ft., 22,000 ft. for ½", 7/16" and 3/8" strand, respectively. The problem of the disposal of empty wood reels also is eliminated.

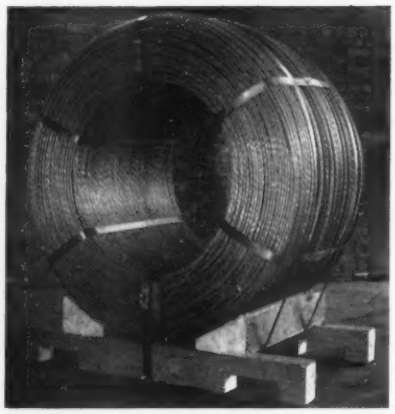


Fig. 1 — The Roebling "Reel-less Pak" is shipped as shown above with the addition of a weather-proof covering, ready to be mounted on the take-apart steel reel.

* * *

These are the salient points in the method: The strand is shipped to the prestressed fabricator in a bundled package of approximately 6000 lbs. The fabricator uses a take-apart, steel pay-off reel of the same outside dimensions as the standard wood reels. After the steel reel is assembled on the package, it is handled in the same way as the present wood reels.

* * *

The new type packaging of prestressed concrete strand is supplied through Roebling's Construction Materials Division located at Trenton, N. J.

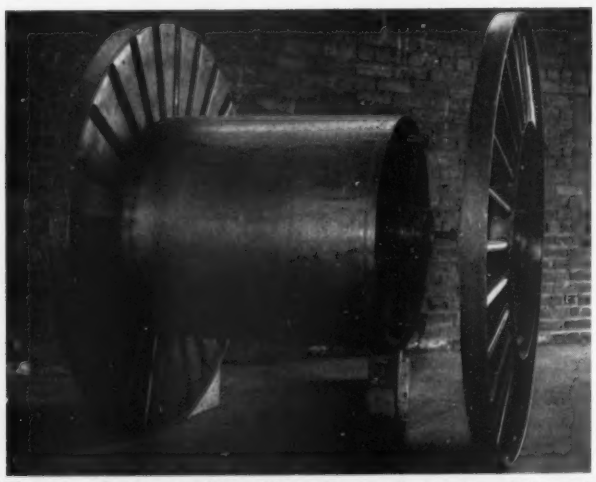


Fig. 2 — In two sections, this steel pay-off reel is quickly and simply mounted on the Roebling package. The reel is of the same outside dimensions as standard wood reels now in use.

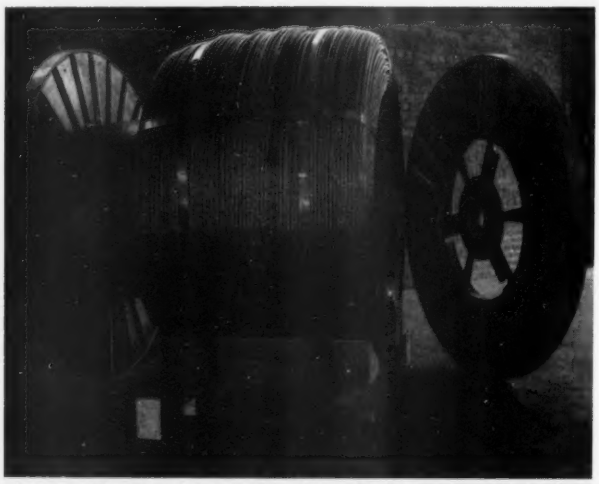


Fig. 3 — The drum is easily placed through the center of the package and the end flange mounted. The reel is now ready for placement in the pay-off racks.

Sidney Rolle

At the meeting of the Board of Directors of The Wire Association held on April 26, 1961 a resolution was passed expressing the profound regret and sorrow at the passing of Sidney Rolle, a widely-known, loved and respected member of the Association.

Mr. Rolle died as a result of an automobile accident near Auranches, France, on March 25, 1961. He had been a Consulting Metallurgical Engineer since 1954, when he retired as Assistant Manager of The Scomet Company, a Subsidiary of The American Metal Company, with which firm he had been associated for forty-four years.

A past director of The Wire Association and active in many capacities in its work over the years, Mr. Rolle had served the industry with distinction. In 1951 he was the Mordica Memorial lecturer, his subject being "The Fabrication of Copper Wire."

The Association's loss is the Wire Industry's loss and the members of the Board of Directors hereby record their appreciation of all that Mr. Rolle has done in the past to further the interests of our industry through the channels of The Wire Association and his personal activities.

The Wire Association

Raymond S. Worth
President

Richard E. Brown
Executive Secretary

Novel Method for Speed Variation Used in Europe

by Leo Walter
Consulting Engineer
Painswick, England

This article describes a new type of variable speed drive developed in France for wire winding operations.

Variation of speed is one of the main factors to be considered for reeling arrangements in wire manufacture. The use of special geared motors has greatly eased the job of the designer for reeling equipment.

* * *

A few years ago, arrangements for receiving wire from drawing machines (bare wire) and from slubbing machines (coated wire) presented numerous problems. The continuous operation of groups of machines was even more difficult. Drawer-slubbers for coated wires; Drawer-assemblers for twisted wires; Drawer-ovens for enamelled wires; and also machinery for the conditioning of the finished wire are examples. (Fig. 1).

* * *

A French firm, Ets. Godderidge at Houilles (Seine and Oise) has designed and perfected an ingenious machine covered by world patents (Geoffrey Delore and Godderidge patents) which brings a rational solution to these problems. (See Fig. 1). The Godderidge reeling machine is composed principally: (a) of a geared motor variator unit that allows selection of the ideal operating speed for a wire of given section and for the desired operation (tinning—enamelling—drawing—annealing); a SADI type was chosen. (b), of a spire preforming device depending on which the wire will be delivered to the receiving drum or passed on for a further operation; (c) of a drawing capstan complete with a braking system that allows the wire to be pulled forward **under a strictly constant tension;** (d) of a "paying-off' arrangement that delivers the wire in layers thus allowing maximum use of the available space of wind-up drum or conditioning arrangement; (e) and finally of a

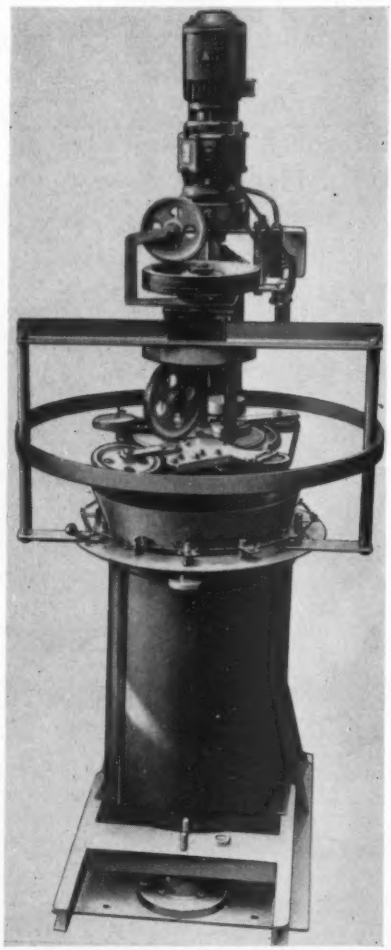


Fig. 1 — Godderidge Reeling Machine for wire. Courtesy of Ets. Godderidge, Houilles (Seine & Oise), France. * * * * * * * *

"wire battery" that holds back the wire whilst changing the wind-up drum. This last operation can be rendered easier and carried out more rapidly by a revolving platform placed under the machine.

Method of Operation

Looking at Fig. 2, the equipment works as follows. The Wire F_1 comes from the previous machine, whether drawer, slubber, oven etc.). It is firstly placed in the vertical axis of the machine.

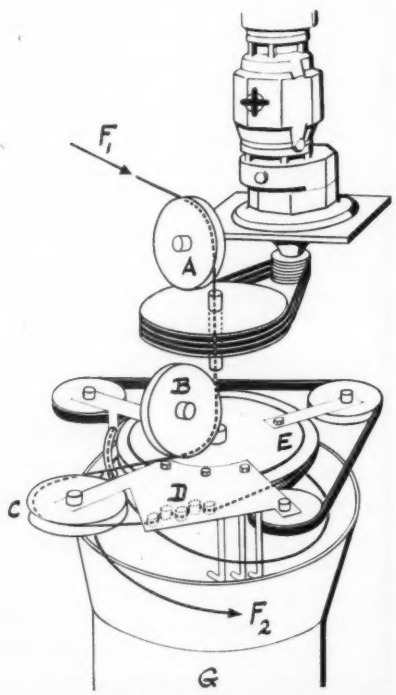


Fig. 2 — Method of operation. * * * *

An adjustable pulley "A" performs this job. Positioning rollers "B" and "C" locate the wire then in a horizontal plane. The wire then passes through a set of 5 adjustable rollers "D". Their job is to preform the spire before entering into the drawing capstan "E". This method draws the wire under constant tension and feeds the "pay-off" equipment "F_2". The latter delivers the wire in desired layers to the receiving drum "G". Fig. 3 illustrates the revolving platform "H". This allows easy and quick change of drums. During this op-

(*Please turn to page* 793)

A Million Severely, Multi-Formed Parts Without Rejects Result from Wire with Consistent Tensile

A case-history story of a wire product fabricator, describing a tough forming job and the bearing of uniformity of physicals on good production results.

Consistent tensile strength in successive lots of stainless steel wire has enabled **Dudek & Bock Spring Manufacturing Co.**, Chicago, to produce a million parts, undergoing multiple forming operations, without a reject.

* * *

The company is using the wire to mass produce, within unusually tight tolerances, door hinges for home laundry equipment manufactured by the **Whirlpool Corp.**, St. Joseph, Mich.

* * *

Five different hinges, on separate production runs, are made on automatic four-slide wire forming equipment. The parts are severely formed from 0.1875″ Type 430 stainless wire supplied cold drawn by the **Webb Wire Division** of The Carpenter Steel Co., New Brunswick, N. J. Tensile strength of the wire averages close to 100,000 psi.

* * *

To give the wire a bright finish as well as proper tensile, the mill gives each coil a light pass before it is shipped. Appearance of the hinge made from the wire is extremely important, as is the resistance Type 430 stainless offers to the corrosion attack of modern detergents.

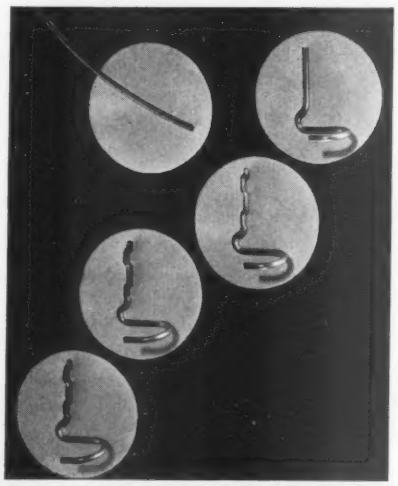


Fig. 2 — Progressive steps in the production of a precision hinge from 0.1875″ stainless wire, lower left, show the part after automatic four-slide forming (top), punch press flattening, drilling and tapping, and passivating and burnishing. * * * * * * * * * * * * * * *

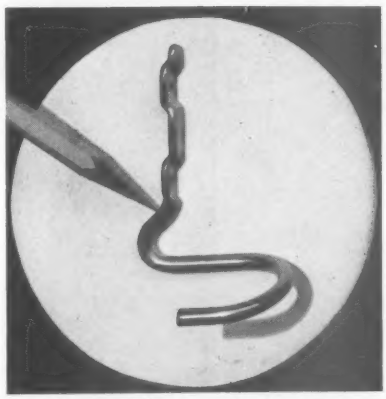


Fig. 1 — Door hinge, made from Type 430 stainless wire, indicating critical radius subject to fracture during forming operation if material does not have proper tensile strength. * * *

* * *

All specified tolerances for the hinges — made from approximately 5¾″, 5″ and 3½″ lengths — are governed by the diameter and tensile strength of the wire. Limits of plus/minus 0.001″ must be held on diameter so that tolerances can be met in formed flat sections. In actual practice, diameter tolerances have been held to plus/minus 0.0005″.

* * *

Inconsistent tensile properties at one time had created several costly problems. Rejects, because of serious distortion, ran from 5 to 7% on large production runs. The wire was either too hard or too soft for accurate forming so that many hinges had to be thrown away or reworked at considerable expense. Inspection costs for quality control were substantial.

* * *

Since the tooling was adapted for working material of a given tensile strength, the problem of die breakage arose when the wire was too hard. Wire that was too soft went well beyond tolerances on sections where width and thickness were critical. * * *

Every hinge, which has to fit perfectly on the washer or dryer door for years of hard use, undergoes a varying number of cold forming operations. The wire must have high elongation to conform precisely to the shapes and contours desired. In several instances, critical radii, which are about 70% as thick as adjacent flat bearing surfaces, would fracture in bending to shape if the material were too brittle.

* * *

The punch press flattening of four different bearing surfaces is an especially delicate proposition. Width and thickness tolerances of the formed flat sections must be held to plus/minus 0.0075″ on automatic washer hinge. With consistent tensile and dimensional accuracy in the supplied wire, Dudek and Bock have been able to hold this tolerance within plus/minus 0.003″.

(*Please turn to page* 795)

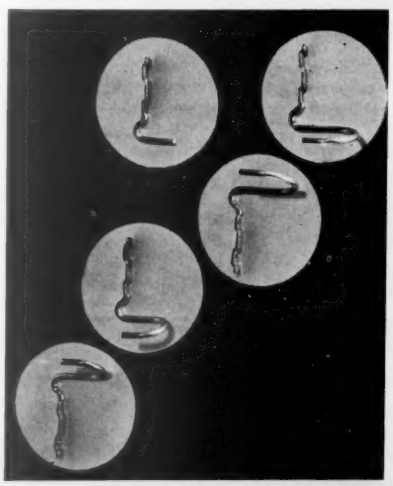


Fig. 3 — Variety of hinges made from 0.1875″ Type 430 Carpenter stainless wire by Dudek & Bock Spring Manufacturing Co., Chicago, Ill. Hinges are used on home laundry equipment made by Whirlpool Corp., St. Joseph, Mich. *

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an old Mill Superintendent told us when we asked "What do you like best about Micro-Welders?"

He went on to say that unskilled help at his plant quickly learn how to make good, clean welds on our Micro-Welders.

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Shop Superintendents also Praise Micro-Welders for Durability, Efficiency, Adaptability and low cost of Maintainance.

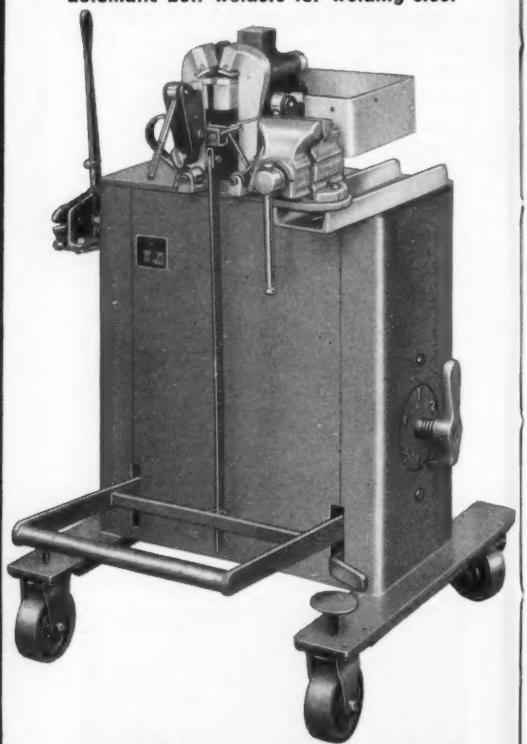
ask the firms that use micro-welders

For instance, our Model "J" Type Automatic Butt Welders are vital cogs in the plants of:

United States Steel • Steel Company of Canada • Simplex Wire and Cable • Nehring Electrical Works • Mid-States Steel and Wire • Laclede Steel • Kennecott Wire and Cable • Kaiser Aluminum • Jones and Laughlin • International Nickel • B. F. Goodrich Company • B. Greening Wire Company • Copperweld Steel • Continental Steel • Broderick and Bascom Rope Company • Bridgeport Brass • Bethlehem Steel • Belden Manufacturing Company • American Chain and Cable.

MICROMETER PRECISION MICRO WELD TRADE MARK REGISTERED

model "J" type
automatic butt welders for welding steel



available in three models:
J-45-S, J-5-S and J-6-S
for welding high and low carbon STEEL wire, sizes from .060" to .375".

The welding cycle on "J" models is automatically completed by one down stroke of the foot pedal. Stock being welded is clamped, contact is made with welding switch and upset pressure on the weld simultaneously achieved.

Included: Annealing dies, filing vise, handshears and 4-wheel truck mounting.

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Imports Are Exporting Your Jobs

The trend in steel import and export statistics for the past several years reveals disturbing evidence that foreign competition is seriously affecting the economy of America, particularly those branches of the steel industry that produce rod, wire and wire products.

* * *

Our company is not the only one affected. One source reports that since 1956 two million Americans have lost their livelihood due to the growing influx of goods of foreign manufacture. Metal working people are wondering where the boom promised for the 1960's has gone. Many suspect it has "gone abroad".

* * *

While American steel product producers are limping along at a disappointing pace, counterpart establishments overseas are zooming ahead at high production levels in up-to-date mills. Our imports are high! Our exports are dwindling! Our steel companies are losing business! Our workers are losing jobs! Our government is losing taxes!

* * *

We no longer have the superiority in facilities that for years permitted us to pay higher wages, and still produce cheaper and better steel products. Foreign producers have wage rates much lower than those paid to United States workers, and, because they have modern equipment, their sales are increasing rapidly at our expense.

* * *

The increase in imports and the decline in exports of steel products, including pig iron, has not occurred overnight as is shown in the following tabulation of tonnages:

Year	*Exports*	*Imports*
1957	6,074,163	1,388,752
1958	2,802,805	1,931,559
1959	1,697,313	5,137,349
1960	3,100,711	3,720,349

This is published with the permission of A. F. Franz, President of The Colorado Fuel & Iron Corporation, who wrote the original article, which has been briefed for this republication privilege.

While we hear much about imports and exports balancing each other, which may be true for industry as a whole, the following statistics reflect the impact of imports on the types of products that our company makes, which is the experience of many other similar mills. These are 1960 figures in net tons.

Products	*Exports*	*Imports*
Wire Rod	10,237	408,216
Concrete Reinforcement Bars	15,872	515,541
Hot Rolled Bars	43,833	127,787
Structural Shapes	283,972	501,287
Steel Pipe & Tubing	195,197	480,091
Wire Nails	4,661	237,759
Wire Fencing	1,350	27,949
Barbed Wire	565	52,973
Wire Rope & Strand	9,400	36,000
Steel Wire	13,951	206,661
Galvanized & Other Coated Wires	8,392	26,969
Pig Iron	111,773	330,847
Totals	699,203	2,946,080

Source: U. S. Department of Commerce

* * *

So far as we are concerned foreign competition is no phony scarecrow. It is a startling and disturbing reality! Other steel companies similarly are affected. Only in sheet and strip has the balance of trade been favorable.

* * *

Foreign competition emphasizes that we are not alone in the market places of the world. For every product made here there is a long list of competitors turning out a similar one. This competition is not alone foreign, but American as well. Competition has been the driving force behind our achievements that have made America the most progressive and most envied country in the world.

* * *

In America we have been champions of the right to compete. Now we are being challenged. This is a competitive world and no laws, agreements or protective organizations are going to change this fact. If foreign competition jolts us out of our smugness and arouses us to the realities of competition, we must face the challenge and meet competition from wherever it comes. We must progress and grow. We must contribute our best to earn the best!

* * *

What can American mills do?

* * *

Once we know the problem we can face it. It is something that both management and employees must meet. Here are some points we all must strive to achieve:

1. **Maintain quality standards that assure a quality of product that is second to none.**
2. **Provide service that is the best.**
3. **Give the customer what he wants, when he wants it.**
4. **Fight for orders and work to keep them.**
5. **Do a full day's work for a full day's pay.**
6. **Handle machinery, equipment and supplies with care and without waste.**
7. **Look for new, better and more efficient ways to do a job.**
8. **Consider that each of us has a personal obligation to reduce costs and increase production.**
9. **Labor and management must cooperate completely.**

* * *

Manufacturers, labor unions and the public must unite in a common effort to keep the American steel industry competitive at home and abroad. You and all of us are interested in preserving American jobs.

Imports by U.S. Customs Districts and Cou

CF&I-type products 1960-net tons

Washington Customs District	
Wire Rods	338
Concrete Reinforcement Bars	2,812
Hot Rolled Bars	568
Structural Shapes	2,597
Steel Pipe and Tubing	13,976
Wire Nails	3,617
Wire Fencing	705
Barbed Wire	1,117
Wire Rope and Strand	838
Round Wire and Steel Wire	4,544
Galv. and Other Coated Wire	367
Pig Iron	2,765

Oregon Customs District	
Wire Rods	401
Concrete Reinforcement Bars	4,264
Hot Rolled Bars	2,091
Structural Shapes	7,669
Steel Pipe and Tubing	15,354
Wire Nails	4,777
Wire Fencing	1,477
Barbed Wire	1,954
Wire Rope and Strand	1,986
Round Wire and Steel Wire	6,219
Galv. and Other Coated Wires	176
Pig Iron	852

San Francisco Customs District	
Wire Rods	10,107
Concrete Reinforcement Bars	19,188
Hot Rolled Bars	2,233
Structural Shapes	6,035
Steel Pipe and Tubing	39,084
Wire Nails	17,784
Wire Fencing	1,297
Barbed Wire	1,868
Wire Rope and Strand	2,341
Round Wire and Steel Wire	10,635
Galv. and Other Coated Wire	1,181
Pig Iron	10,030

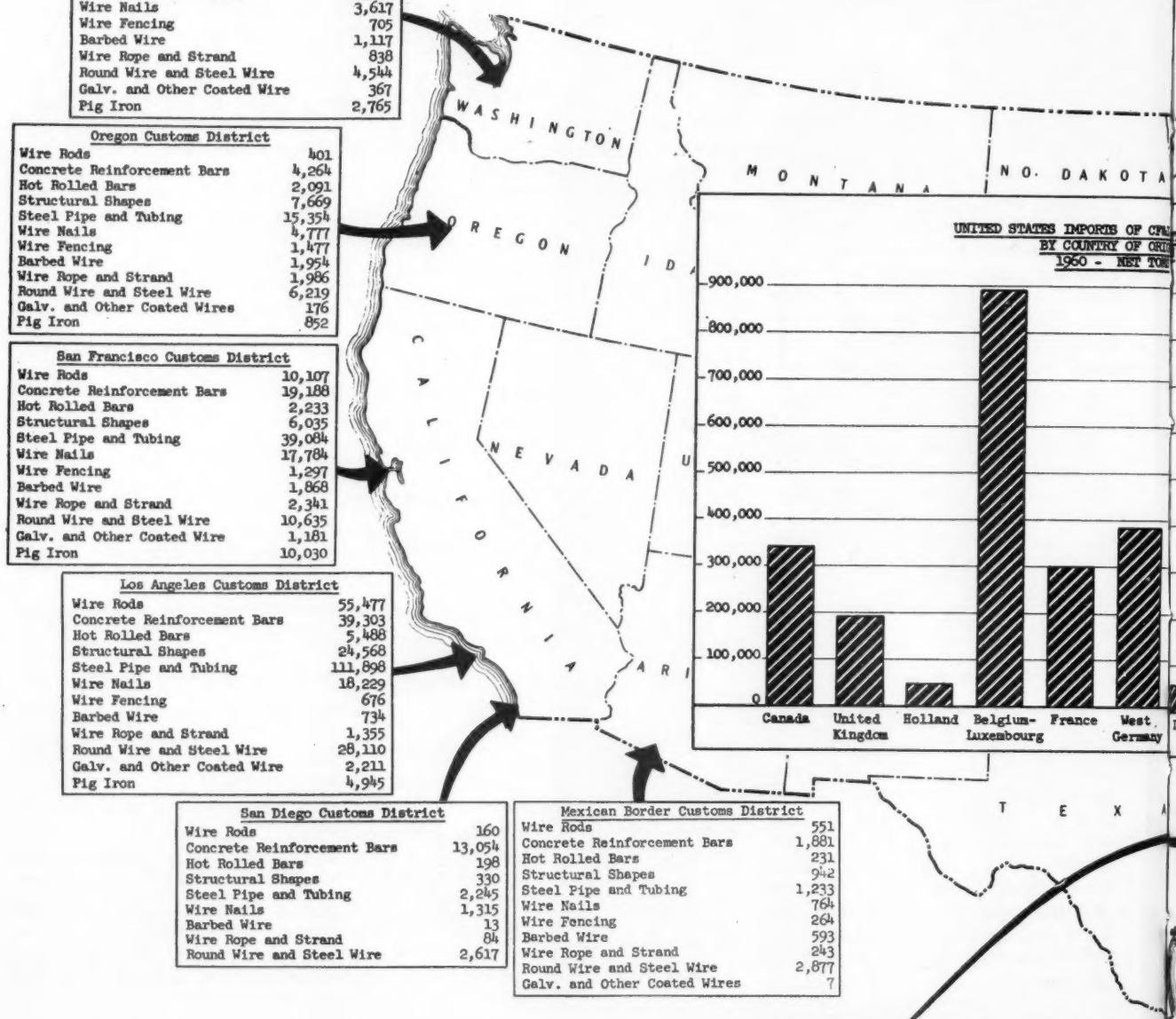
Los Angeles Customs District	
Wire Rods	55,477
Concrete Reinforcement Bars	39,303
Hot Rolled Bars	5,488
Structural Shapes	24,568
Steel Pipe and Tubing	111,898
Wire Nails	18,229
Wire Fencing	676
Barbed Wire	734
Wire Rope and Strand	1,355
Round Wire and Steel Wire	28,110
Galv. and Other Coated Wire	2,211
Pig Iron	4,945

San Diego Customs District	
Wire Rods	160
Concrete Reinforcement Bars	13,054
Hot Rolled Bars	198
Structural Shapes	330
Steel Pipe and Tubing	2,245
Wire Nails	1,315
Barbed Wire	13
Wire Rope and Strand	84
Round Wire and Steel Wire	2,617

Mexican Border Customs District	
Wire Rods	551
Concrete Reinforcement Bars	1,881
Hot Rolled Bars	231
Structural Shapes	942
Steel Pipe and Tubing	1,233
Wire Nails	764
Wire Fencing	264
Barbed Wire	593
Wire Rope and Strand	243
Round Wire and Steel Wire	2,877
Galv. and Other Coated Wires	7

Galveston Customs District	
Wire Rods	48,870
Concrete Reinforcement Bars	124,760
Hot Rolled Bars	18,027
Structural Shapes	112,959
Steel Pipe and Tubing	105,846
Wire Nails	23,205
Wire Fencing	1,934
Barbed Wire	12,785
Wire Rope and Strand	6,827
Round Wire and Steel Wire	19,168
Galv. and Other Coated Wire	1,288
Pig Iron	2,093

New Or... Customs Dist...	
Wire Rods	
Concrete Rei...	
Hot Rolled B...	
Structural S...	
Steel Pipe a... Tubing	
Wire Nails	
Wire Fencing	
Barbed Wire	
Wire Rope a... Strand	
Round Wire a... Steel W...	
Galv. and O... Coated	

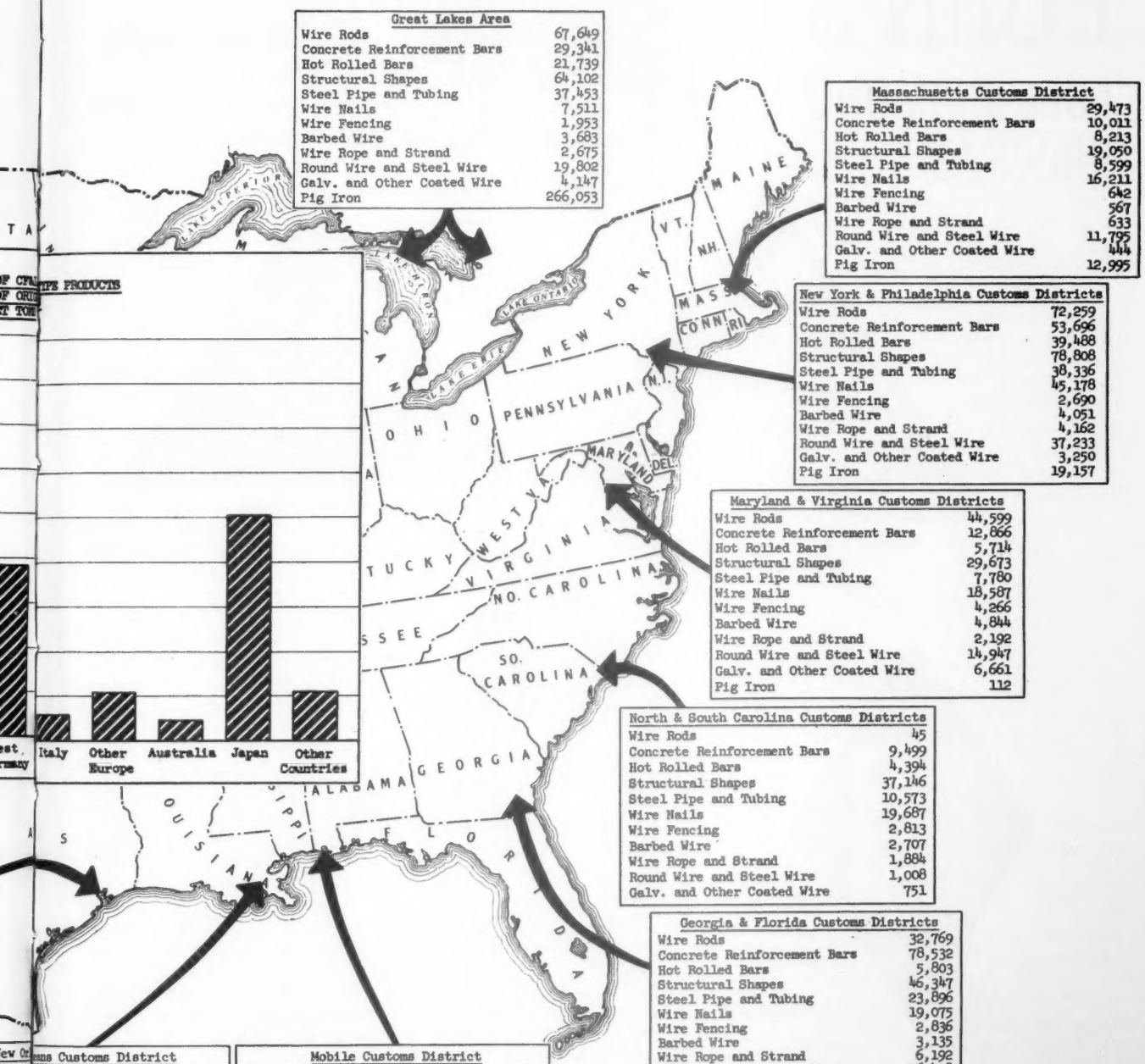


Original Map - Permission of Hotchkiss Mapping Co.
Source of Data - U. S. Department of Commerce

Imports of CF&I-type products —— 2,946,080 net tons

Exports of CF&I-type products —— 699,203 net tons

Country of Origin



Great Lakes Area	
Wire Rods	67,649
Concrete Reinforcement Bars	29,341
Hot Rolled Bars	21,739
Structural Shapes	64,102
Steel Pipe and Tubing	37,453
Wire Nails	7,511
Wire Fencing	1,953
Barbed Wire	3,683
Wire Rope and Strand	2,675
Round Wire and Steel Wire	19,802
Galv. and Other Coated Wire	4,147
Pig Iron	266,053

Massachusetts Customs District	
Wire Rods	29,473
Concrete Reinforcement Bars	10,011
Hot Rolled Bars	8,213
Structural Shapes	19,050
Steel Pipe and Tubing	8,599
Wire Nails	16,211
Wire Fencing	642
Barbed Wire	567
Wire Rope and Strand	633
Round Wire and Steel Wire	11,795
Galv. and Other Coated Wire	444
Pig Iron	12,995

New York & Philadelphia Customs Districts	
Wire Rods	72,259
Concrete Reinforcement Bars	53,696
Hot Rolled Bars	39,488
Structural Shapes	78,808
Steel Pipe and Tubing	38,336
Wire Nails	45,178
Wire Fencing	2,690
Barbed Wire	4,051
Wire Rope and Strand	4,162
Round Wire and Steel Wire	37,233
Galv. and Other Coated Wire	3,250
Pig Iron	19,157

Maryland & Virginia Customs Districts	
Wire Rods	44,599
Concrete Reinforcement Bars	12,866
Hot Rolled Bars	5,714
Structural Shapes	29,673
Steel Pipe and Tubing	7,780
Wire Nails	18,587
Wire Fencing	4,266
Barbed Wire	4,844
Wire Rope and Strand	2,192
Round Wire and Steel Wire	14,947
Galv. and Other Coated Wire	6,661
Pig Iron	112

North & South Carolina Customs Districts	
Wire Rods	45
Concrete Reinforcement Bars	9,499
Hot Rolled Bars	4,394
Structural Shapes	37,146
Steel Pipe and Tubing	10,573
Wire Nails	19,687
Wire Fencing	2,813
Barbed Wire	2,707
Wire Rope and Strand	1,884
Round Wire and Steel Wire	1,008
Galv. and Other Coated Wire	751

Georgia & Florida Customs Districts	
Wire Rods	32,769
Concrete Reinforcement Bars	78,532
Hot Rolled Bars	5,803
Structural Shapes	46,347
Steel Pipe and Tubing	23,896
Wire Nails	19,075
Wire Fencing	2,836
Barbed Wire	3,135
Wire Rope and Strand	6,192
Round Wire and Steel Wire	26,498
Galv. and Other Coated Wire	2,637
Pig Iron	6,866

ans Customs District	
	37,735
orcement Bars	26,960
	6,619
pes	50,584
Tubing	20,971
	19,411
	3,560
	9,497
Strand	2,584
Steel Wire	9,652
Coated Wire	3,053

Mobile Customs District	
Wire Rods	5,673
Concrete Reinforcement Bars	7,289
Hot Rolled Bars	1,950
Structural Shapes	10,990
Steel Pipe and Tubing	13,344
Wire Nails	7,840
Wire Fencing	2,251
Barbed Wire	3,322
Wire Rope and Strand	1,286
Round Wire and Steel Wire	5,512
Galv. and Other Coated Wire	490

All Other Customs Districts	
Wire Rods	2,110
Concrete Reinforcement Bars	82,085
Hot Rolled Bars	5,031
Structural Shapes	9,487
Steel Pipe and Tubing	29,503
Wire Nails	8,568
Wire Fencing	585
Barbed Wire	2,103
Wire Rope and Strand	718
Round Wire and Steel Wire	6,044
Galv. and Other Coated Wires	306
Pig Iron	4,979

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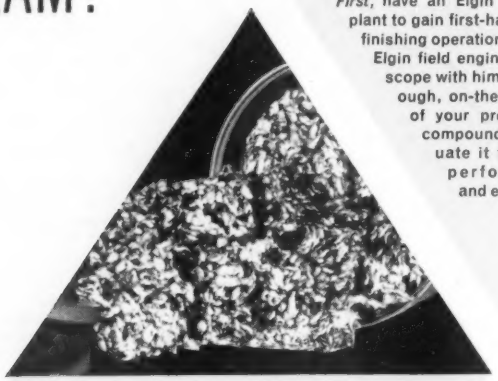
First, have an Elgin field engineer visit your plant to gain first-hand information on your finishing operations and problems. Each Elgin field engineer carries a microscope with him to conduct a thorough, on-the-job examination of your present diamond compound and to evaluate it for quality, performance, and economy.



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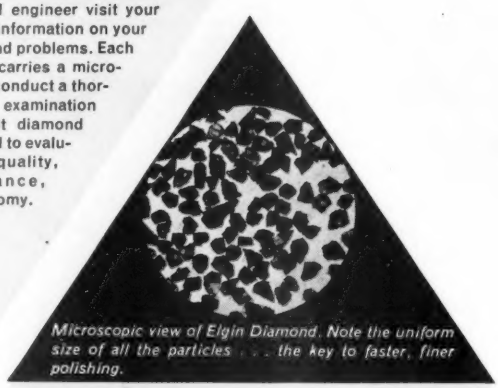

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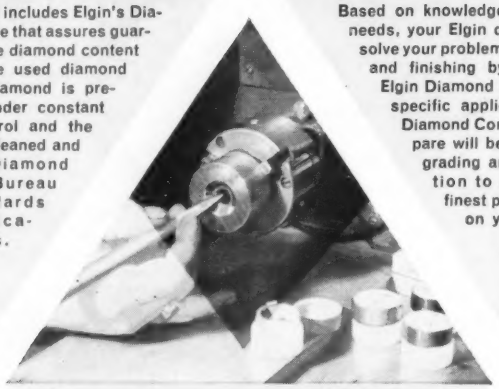
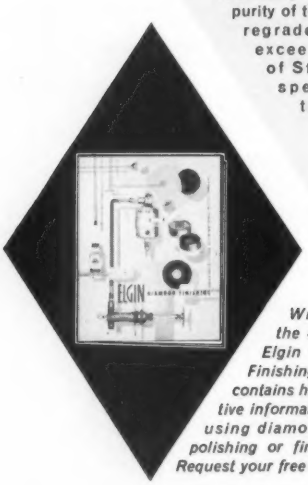


A typical application of Elgin Diamond is its use by a Midwestern alloy manufacturer who draws wire from some of the toughest alloys made. The firm's engineers determined that efficient, economical production depends on "a mirror finish free from all scratches on the carbide drawing dies." To obtain such a finish, they specified Elgin Diamond.



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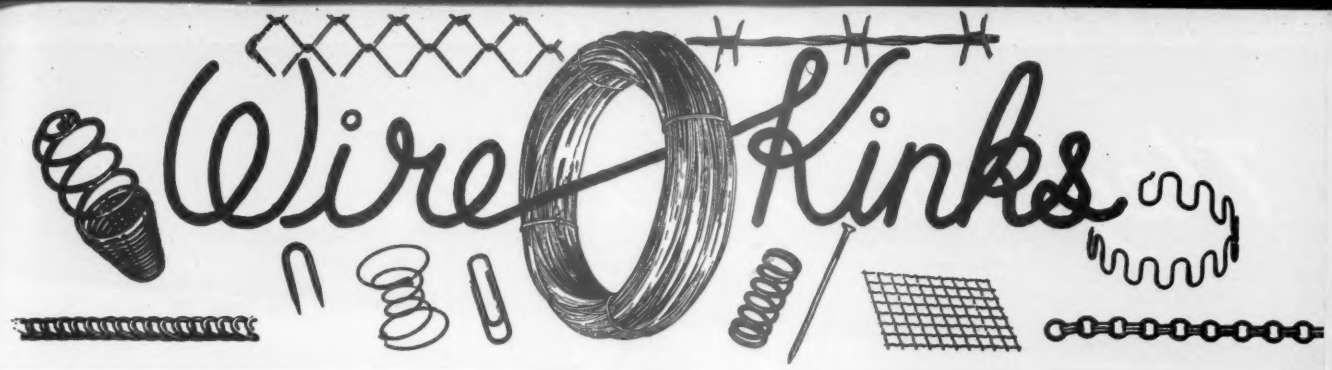


Ancient Roman Nails Are Rust Resistant

Professor Ian Richmond, who lectures on archeology at Oxford University, discovered in an excavation in the vicinity of the Roman encampment of Inchtuthill on the Tay in the Scottish Highlands at a depth of nearly six feet a storage dump of twelve tons of nails. It stems from the time when the Romans maintained a garrison in this area in 90 B.C. The garrison was recalled, and apparently wanting to keep this lot of nails out of the clutches of the wild Caledonians, they buried the entire supply of nails. Professor Richmond discovered these about a dozen miles north of Perth.

* * *

These nails have a square cross-section and are between two and sixteen inches long. The surrounding earth consists chiefly of sand and gravel and is readily permeated by water. No traces whatever of sacking or boxes were found, yet the nails look today as new as if they had just been forged. Up to the present this excellent maintenance of condition has not been explained. Today under similar conditions the iron would long since have been strongly rusted, if not entirely decomposed. Whether the Roman nail smith knew a special technique or process for protecting against corrosion in such a remarkable manner is a mystery that awaits a solution.

* * *

Sir Alexander Fleck alluded to this when he recently opened an exhibition in London of which the theme was corrosion and surface treatment of metals. He recalled the famous iron column in Delhi, which for over 1600 years has been exposed to the weathering in a most pronounced tropical climate.

Readers are invited to send us how-to-do-it items for this department. For each item received that is published we will pay contributors $10.00. Your co-operation will be appreciated by us and our many readers. May we hear from you?

It has a height of about 26 feet, weighs six tons and is constituted of 99.7% pure iron, that today shows not the least traces of corrosion. Still another column of iron exists in Dhar, also in India. It was erected in 321 B.C. and still is without any trace of rust. Scientists the world over have tried to uncover the secret of this resistance to corrosion; one conjecture is that these Indian columns have a thin coating of slag, and another is that their excellent condition results from their having been forged on stone anvils.

—from Drahtwelt, Jan., 1961. Translated by Jerome W. Howe.

Fourdrinier Wire

QUESTION

I would greatly appreciate your giving me some information on Fourdrinier Wire. What I particularly want to know is something about the metals used, their properties and processing.

ANSWER

Fourdrinier Wire, named after one Sealy Fourdrinier, who was chiefly responsible for the invention of the Fourdrinier paper making machine early in the 19th century, is a wire used in the endless belts to support the sheets of paper in the process of removing excess water from the paper stock or pulp, which contains 97 to 99 percent of water. The wire screen is vibrated as it travels, to shake out the water.

* * *

In the early days, when speeds were slow and the paper widths narrow, brass wire was used. As speeds increased from 200 or so feet per minute to 2000 or more feet per minute and paper widths became larger and larger, brass wire no longer was sufficiently strong and durable, although some brass screens still are employed.

* * *

It therefore became necessary to use a stronger wire and phosphor bronze wire was turned to. Such wire 7-8 percent of tin, 0.2-0.3 percent of phosphorous, with the balance copper. This material generally is used for the lengthwise running warp wires, which take all of the tension and wear and have the additional properties of being highly corrosion and fatigue resistant. Brass is commonly used for the chute or filler wires because it is cheaper, although some 3 percent tin bronze wire is used for fillers where unusual corrosive effects are encountered in paper making. Steel and stainless steel have been found to work-harden too readily to be satisfactory, as they fatigue crack before they become worn out.

* * *

The wire is drawn on the conventional wet wire drawing machine to sizes varying from .020" to .004", depending upon the Fourdrinier screen to be woven. Tolerances of plus or minus .0001" are maintained. The finished wire, being hard-drawn, must be annealed, with consideration given to uniformity of grain size and tensile strength, which are highly important in a wire to be subjected to severe flexing and stress in the paper machine.

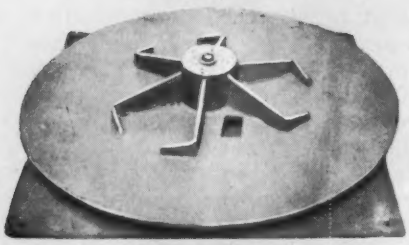
* * *

The wire then is loom woven, the screen cut to length and the ends brazed or welded together to form an endless belt. Early Fourdrinier wire was laced or tied together, but this became unsatis-

They go together.....

NEW 2 in 1 FEATURE

18-22 WIRE CARRIER



PAY-OFF REEL

#25 Dia. WIRE CARRIER

WIRE CARRIERS and PAY-OFF REELS

Reduce Initial Investment Cost 50% With This Amazingly NEW 2 in 1 Feature By *Wire Machinery, Inc.*

Our parent company has pioneered the development of Wire Carriers and Pay-Off Reels. PURPOSE — to improve plant efficiency and reduce your initial investment. This design enables you to use 2 different sized wire carriers (18" Dia. and 22" Dia.) on our standard #18-22 Lazy Susan-Pay Off Reel. Material handling time and expense substantially reduced with this unique feature.

We'll gladly share our experience with you and invite you to our Chicago Plant to see for yourself how our 2 in 1 feature performs in Production.

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WIRE CARRIERS and PAY-OFF REELS

Large packages as shown on gravity blocks are perfect for feeding nail machines, screw machines, straighten and cutting, annealing, patenting, and/or galvanizing furnaces.

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Wire Kinks

factory as speeds and widths increased. In Europe welding the seams is common, whereas here the seams are made largely by brazing, using silver solder. These are considered stronger and more flexible than welded seams.

* * *

The whole procedure calls for wires and processes of the utmost precision, and inspection at every step is necessary.

Interesting Applications Spark Profitable Ideas

Stanley-Humason's ability to meet the fastener requirements of its customers and solve a variety of production and assembly problems is convincingly demonstrated by the following examples and accompanying illustrations.

* * *

Example A was designed and produced for a toy maker who required a multiple-function unit that would perform a fastening function and also provide linkage and spring action. Activating the bellows that makes a toy cow "moo," this Stanley-Humason assembly performs all three functions. Designed for production-line installation, it keeps assembly time and number of components to a minimum.

* * *

Example B was developed for an electrical components manufacturer who had to hold an adjusting screw so it was vibration-proof, yet could float into alignment with other parts during assembly. As in most other cases, the fastener had to be easy to assemble as well as self-supporting.

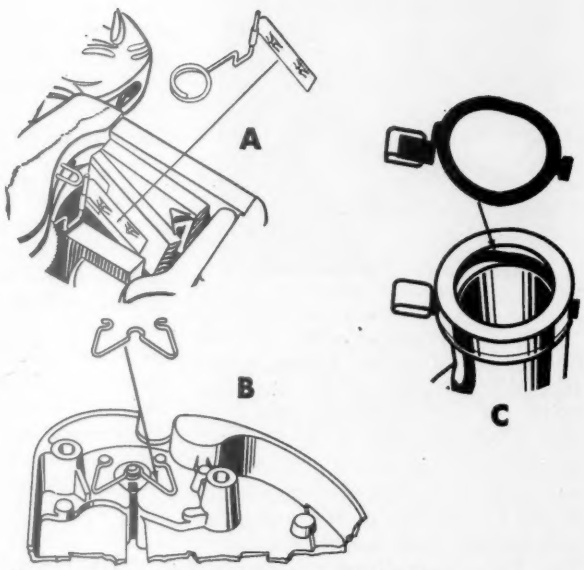
* * *

Example C made it possible for a manufacturer to lock positively a piece of tubing in a cast housing . . . yet allow instant release with finger-tip pressure. Both conditions were met by pre-forming a ring stamped from spring steel to provide the necessary locking medium.

* * *

Stanley-Humason has successfully supplied hundreds of manufacturers with custom-designed fasteners that were used because no available standard items would provide dependably secure fastening under the specific conditions involved. In addition, the use of Stanley-Humason custom fasteners has often made it possible to effect important savings by speeding assembly time or reducing the total number of components in an assembly.

* * *



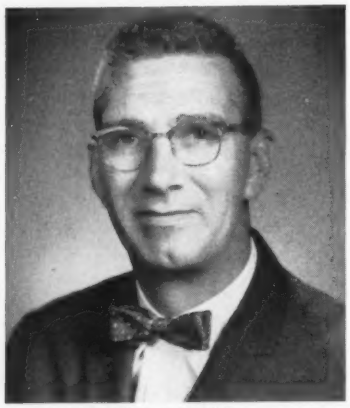
Courtesy of Stanley-Humason, Inc., Forestville, Conn. * * *

Custom fasteners are freqently used to incorporate two or more ordinarily incompatible characteristics, such as easy assembly and removal plus the ability to resist loosening under vibration. Equally important, the fastener must be designed to permit efficient, economical manufacture, keeping cost to the customer at a minimum. Material and finish for the fastener must also be selected with extreme care.

* * *

As the examples listed above amply demonstrate, a custom fastener designed and produced by Stanley-Humason can be a great deal more than simply a means for joining two components . . . and may well pave the way for important reduction in product costs or improvements in performance.

Awards for 1960 Papers Announced by The Wire Association



Gilbert D. Dill

The Chairman of the Awards Committee, **Dartrey Lewis,** Chief Engineer, Research & Development, John A. Roebling's Sons Div., The Colorado Fuel & Iron Corp., presented to the Board of Directors on April 26, 1961, the selections of the Committee of those authors and papers that merited awards. The Board approved the choices and the awards will be presented formally at the Annual Convention of The Wire Association in October, 1961, at French Lick, Indiana. The men and their respective papers are:

FERROUS DIVISION

Medal Award: GILBERT D. DILL, Consultant on Blast Cleaning & Materials Handling, Mishawaka, Ind., for his paper: "An Economic Analysis of Acid Pickling vs Multiple Strand Blast Cleaning of Wire Rod.

* * *

Honorable Mention: KENNETH P. BROWN, Commodity Specialist, Pacific Metals Co., Ltd., Los Angeles, Cal., for his paper: "The New Nickel Alloys in Wire for Special Applications."

NON-FERROUS DIVISION

Medal Award: ROBERT C. LAWRENCE, JR., Sales Representative, Chemical Products Corp., East Providence, R. I., for his paper: "Vinyl Plastisol — A Versatile Material for Insulating Wire and Encapsulating Wire Harness Constructions."

* * *

Honorable Mention: DAVID BARR, Plant Engineer, National Electric Div., H. K. Porter Co., Ambridge, Pa., for his paper: "Installation of a Semi-Automated TW Wire Extrusion, Coiling and Boxing Facility in a Medium Sized Wire Plant."

* * *

Each award will be accompanied by checks in the amounts of $100.00 and $50.00 respectively for Medal Awards and Honorable Mention Certificates.

Conditions of Eligibility of Papers

The first consideration of eligibility is that the author or authors must be Association members. A second is that it must be a contribution to the Association or to **Wire and Wire Products,** as articles for which the magazine has paid an honorarium cannot be considered. A third is that any paper that has been previously presented before another society or published in another magazine cannot be taken under advisement for awards.

* * *

Members of the Awards Committee are:

DARTREY LEWIS, (Chairman)
Chief Engineer, Research & Development
John A. Roebling's Sons Division
The Colorado Fuel & Iron Corp.
Trenton, N. J.

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New Brunswick, N. J.

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John A. Roebling's Sons Div.
The Colorado Fuel & Iron Corp.
Trenton, New Jersey

(*Please turn to page* 806)

1960 Supplements To Book of ASTM Standards

Part 1. Ferrous Metals Specifications—444 pages. Includes 63 standards on steel pipe, tubes, castings, bolting materials, boiler plates and rivets, sheet and strip, bars, forgings, chain, corrosion and heat-resisting steels. Also structural and rivet steel, coated steel and iron products, wrought iron, cast iron, ferro-alloys, titanium alloys, zinc coated steel, metal powder products and steel rails.

* * *

Part 2. Non-Ferrous Metals Specifications and Electronic Materials—348 pages. Includes 57 standards for copper and copper-base alloys, ingot, plate, sheet, strip, rolled bar, shapes, wire, die forgings, pipe and tubes. Also solder metal, zirconium, lithium, materials for electron tubes and semi-conductor devices, metal powders and electrodeposited metallic coatings. In addition there are standards for die-cast metals, aluminum and aluminum alloys, magnesium and magnesium alloys, and metallic electrical conductors.

* * *

Part 3. Methods of Testing Metals (Except Chemical Analysis)—180 pages. Includes 19 standards for tests for mechanical properties, effect of temperature, dosimetry, electrical and magnetic properties. Also included are nondestructive testing metallographic tests, and tests for metal powders.

* * *

Part 4. Cement, Concrete, Mortars, Road Materials, Waterproofing, Soils—240 pages. Includes 40 standards for cement, joint fillers, gypsum, chemical-resistant mortars, aggregates, concrete, curing materials, waterproofing materials, and soils.

* * *

Part 5. Masonry Products, Ceramics, Thermal Insulation, Acoustical Materials, Sandwich and Building Constructions, Fire Tests—238 pages. Includes 44 standards for asbestos-cement products, manufactured masonry units, pipe and ceramic whitewares, acoustical materials, sandwich constructions, drain tile, refractories, porcelain enamel, glass, thermal insulating materials, as well as tests for building constructions and fire tests.

* * *

Part 6. Wood, Paper, Shipping Containers, Adhesives, Cellulose, Leather, Casein—212 pages. Includes 36 standards for wood, wood preservatives, paper and paperboard, shipping containers, adhesives, cellulose, leather, and casein.

* * *

Part 7. Petroleum Products, Lubricants, Tank Measurement, Engine Tests—320 pages. Includes 41 standards for crude petroleum, liquified petroleum gases, motor and aviation fuels, solvents and napthas, engine lubricating oils, industrial oils, turbine oils, electrical insulating oils, greases, spray oils and kerosene.

* * *

Part 8. Paint, Naval Stores, Coal and Coke, Aromatic Hydrocarbons, Gaseous Fuels, Engine Antifreezes—210 pages. Includes 42 standards

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DO YOU have a copy of the 1961 WIRE AND WIRE PRODUCTS BUYERS' GUIDE on your desk for ready reference when you need it?

The 1961 Edition contains literally thousands of changes — of names, addresses, products, etc.

It will tell you quickly who manufactures all kinds of wire machinery, equipment and supplies; who makes different kinds of rod, bar, wire, wire products, strip, billets; and who produces various types of electric wire and cable.

In addition, in the Year Book section, it gives you:

HISTORY OF WIRE ASSOCIATION ACTIVITIES IN 1960

CONSTITUTION AND BY-LAWS OF THE ASSOCIATION

OFFICERS, DIRECTORS AND COMMITTEES FOR 1961

LISTS OF ASSOCIATION MEMBERS BY INDIVIDUALS AND COMPANIES

INDEX TO ARTICLES AND SUBJECTS PUBLISHED IN WIRE AND WIRE PRODUCTS IN 1960

LISTS OF AWARDS PRESENTED FOR MERITORIOUS PAPERS

Every wire man needs this new BUYERS' GUIDE. It is the only directory in the U.S.A. published exclusively for the Wire Industry—a real gold mine of information!

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for pigments, drying oils, fatty acids, solvents, varnish and resins, paints, lacquers, industrial aromatic hydrocarbons and latex paint.

* * *

Part 9. Plastics, Electrical Insulation, Rubber, Carbon Black—494 pages. Includes 68 standards for plastics, molding compounds, and shapes; tests for mechanical, thermal, optical, and permanence properties of plastics. Also included are electrical insulating materials, such as ceramic products, mica products, rubber tapes, etc. There are standards for rubber elastromers, latex, carbon black, sponge, hard rubber, and coated fabrics, belting, hose, gaskets, automotive and aeronautical products.

* * *

Part 10. Textiles, Soap, Water, Atmospheric Analysis, Wax Polishes—334 pages. Includes 46 standards for textile materials such as fibers, yarns, threads, fabrics, nonwoven fabrics, asbestos textiles; cotton, man-made fiber, and wool textiles; soaps, water, atmospheric analysis, and wax polishes.

* * *

The 1960 Supplements, in heavy paper covers, can be obtained from the **American Society for Testing Materials,** 1916 Race St., Philadelphia 3, Pa., at $4.00 per part—or $40.00 for the complete set of ten parts.

New Silicone Catalog Available

A new eight page two-color catalog describing the complete line of **General Electric** silicones and their uses is now available from the Company's **Silicone Products Department,** Waterford, New York.

* * *

Designated CDS-129C, the catalog is liberally illustrated with photos and contains data pertaining to the various silicone products, including a complete selector guide for silicone rubber.

* * *

The catalog is broken down into four general categories dealing with silicone fluids, silicone protective coatings, silicone electrical insulation and silicone rubber. A new feature of the catalog is the

grouping of product types wherever possible under appropriate end-use headings (i.e. paint vehicles, electrical impregnating and coating varnishes, etc.).

* * *

New products described in CDS-129C include RTV-11, the newest and lowest viscosity room temperature vulcanizing liquid silicone rubber; LTV-602, a new clear, flexible silicone potting and embedding compound; and Dri-Film (R) 144, a new solvent based silicone water repellent for use in masonry water repellent formulations.

* * *

Copies are free upon request.

Speed Measurement Systems

General Electric Bulletin GEZ-3251, 12 pages, describes G-E's complete line of a-c and d-c tachometer generators and indicators. Bulletin relates information on instruments' applications, calibration, accuracy, and method of selection. Specifications, schematics and photos of the measurement systems described are also included. For a copy write to General Electric Company, Schenectady 5, N. Y.

Vertical Steel Belt Conveyor For Nails

Engineers at a large Montreal steel company are using a near-vertical steel belt conveyor to carry a steady stream of nails from a floor-mounted hopper to the overhead infeed chute of an annealing furnace. Magnets positioned behind the load-carrying strand pull the nails from the hopper to the belt, and hold them against it during their upward journey.

* * *

A steel belt conveyor was selected for this application because steel is undamaged by the sharp nail points that continuously impinge against the belt as the nails are propelled against it by the strong pull of the magnets.

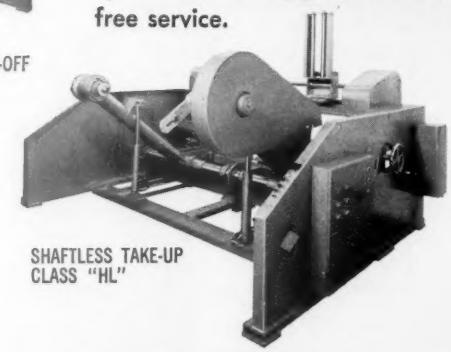
* * *

The conveyor was supplied by **Sandvik Steel, Inc.**, specialist in steel belt conveyors. The belt is made from strip steel especially trued and flattened at

ALL STEEL CONSTRUCTION SHAFTLESS DESIGN

SHAFTLESS PAY-OFF CLASS "HL"

ENTWISTLE combines features to assure simple, space-saving installation, ease of operation and rugged, trouble-free service.



SHAFTLESS TAKE-UP CLASS "HL"

ENTWISTLE "HL" SHAFTLESS TAKE-UPS and PAY-OFFS do not require special pits or elaborate foundations.

Pintle arms are pivotted close to the floor for maximum rigidity.

All drives, transmissions, brakes etc. are mounted integral with pintle arms and are within confines of the frame.

Motorized hydraulic lift elevates reels directly from the floor over range of reel diameters specified for each type.

Pintle arms are positively inter-locked for synchronized rate of lift.

Single control moves both pintle arms simultaneously to automatically centrallize varied reel widths to the cable pass line.

Reel pintles are interchangeable.

Standard units are available in reel capacities from 48" through 110" O.D. and for weights to 25,000 Lbs. (the full line of ENTWISTLE TAKE-UPS and PAY-OFFS covers reels from 16" through 156" O.D. and weights through 50 tons.)

For further information, ask for specification "HL"

Over 40 years of dependable service

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TAPE SERVER - TYPE "B"

VERSATILE

for serving many kinds of tapes

Teflon; vinyl; plastic; cambric; treated and untreated paper; glass; aluminum; brass and copper.

- Equipped with adjustable traverse, supply and windup stands, windup driving mechanism, and electric stop-motion. Capstan-release mechanism permits retracting conductor and replacing it for restarting operation after replenishing supply.
- Machine will apply tapes from ½" wide up to 1" wide on electrical conductors.
- "Reeves" variable speed unit provides for quick adjustment when change of lay is required.
- Production dependent upon width of material and angle of lay.
- Serving head speed dependent upon kind of material. Maximum speed 700 RPM.
- Driving pulley 8" diameter; 1¾" belt. Speed of pulley 330 RPM.
- Ratio serving head speed to pulley speed 2.12 to 1.
- Capstan 18" diameter, 3" face.
- Opening through serving head ⅝" diameter.
- Maximum diameter of flexible conductor ⅜".
- Supply packages 16" diameter, 1" maximum width, ½" minimum width. Size of hole in package 3".
- Supply tube holds eight reserve packages of 1" wide material.
- Maximum power requirement ¾ H.P.
- V-belt motor drive furnished upon request at additional cost.
- Reset counter for measuring product in feet furnished.
- Stands furnished to accommodate reels 30" or 36" in diameter with overall widths up to 16". Wider stands can be furnished upon request at additional cost.
- Special windup drive required for reels with drums under 12" diameter.
- Clamp lock holds windup reel arbor securely in lifter bearing.
- Machine mounted on base plate to assure proper alignment of frame and windup stand.
- Reels not furnished with machine.

Write for complete information

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the mill for conveyor application. It has two rubber V-ropes bonded to the under side. These V-ropes run in grooved terminal sheaves and provide perfect tracking for the belt.

* * *

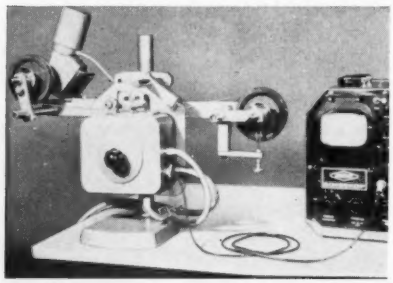
The magnets are of the horseshoe type and are mounted on rails that extend from opposite the feed hopper to the top of the Sandvik conveyor. The nails discharge over the top of the conveyor and fall by gravity into the chute to the annealing furnace.

* * *

Additional information on steel belt conveyors can be obtained from Sandvik Steel, Inc., 1702 Nevins Road, Fair Lawn, N. J.

Ultrasonic Tester for Wire

The firm of **Dr. Lehfeldt & Co.**, Heppenheim, West Germany, announces the development of new equipment for the ultrasonic testing of wire. The Lehfeldt equipment permits the detection of inclusions as well as cracks running in any direction in one operation. Flaws and other discontinuities of the smallest size (as small as 10% of diameter of fine wire), can be detected with great accuracy. The



design of the Lehfeldt equipment has overcome the problems of sound coupling between transducer and wire by using a liquid meniscus formed over an opening. Since there is no longer a mechanical coupling involved, wire can be tested at drawing speeds of up to 200 feet per minute and more. The entire operation can be automatized by the use of additional equipment, also available.

* * *

For full information, contact the U. S. representative, **Marathon Specialty Steels, Inc.**, 375 Park Ave., New York 22, N. Y.

Reynolds Metals Buys Plant for Electric Wire

Having recently purchased the equipment of Roebling's Electric Wire Division to expand its electric conductor business, **Reynolds Metals Company** has disclosed the purchase of an assembly plant of the Ford Motor Company at Chester, Pa., at a cost in excess of $2,000,000.00. The plant is located on the Delaware River.

* * *

Ford discontinued operations at Chester in mid-March. The building, with about 650,000 square feet of floor space, will be converted by Reynolds into a facility for producing insulated wire and power cable.

* * *

Reynolds has cable production capacity of 25,000 tons a year at Sheffield, Ala., near its wire, bar and rod mill. The new facilities will enable the company to provide the electrical industry with a broader range of wire products, particularly in insulated wire.

* * *

The aluminum industry now holds a major portion of the overhead power and bare cable market. Last year, the industry shipped nearly 96,000 tons of ACSR and bare cable.

Surprenant Bought by ITT

The purchase of the **Surprenant Manufacturing Company,** Clinton, Mass., by the **International Telephone & Telegraph Corp.,** has been announced by **Harold S. Geneen,** President of ITT and **Albert H. Surprenant,** President and founder of the Clinton firm.

* * *

Surprenant, one of the largest independent producers of high quality, custom plastic insulated wire and cable, was founded 25 years ago. Its sales, doubled in the last five years, are said to have reached $17 million in the current fiscal year. Its growth has been due to the firm's ability to meet the increasingly difficult technical requirements of the missile, aircraft, space, electronic and computer markets.

* * *

For Moisture Resistance, Specify

TEXTILENE

TWI-FLEX and TWI-WAX

Treated to reduce wicking and prevent leaching, lightly waxed Textilene Twi-Flex and heavily waxed Textilene Twi-Wax provide effective resistance to moisture. Both fillers are extensively employed for non-metallic sheathed cable (building wire), maritime shipboard cable, varnished cambric cable, and underground service entrance cable.

Twitchell's superior Textilene line also includes: Soft, dry fillers — *Twi-Port* and *Glascor** (Fiberglas-centered for high tensile strength without added bulk). Used for control, power, appliance, coaxial and communications cables, and all portable and flexible cords. Fungus-resistant filler — *Twi-Tar*. Used for buried communications cable, expanded ACSR cable, and in other applications.

*Patent Applied For

For Every Wire and Cable Application
Twitchell's TEXTILENE Fillers Fill The Bill

Quality-controlled materials that are dependably uniform . . . in standard forms, or customized to special needs.

Initial low cost with savings added by production efficiency . . . flexible, ready-to-use fillers that fit all equipment, handle and form easily, always maintain desired shape.

Assured supply from a reliable domestic source . . . always available in economical and convenient packaging.

Proved performance as components of cables and wires that meet government specifications . . . stability shown by trouble-free installations in continuous service 20 years and longer.

FREE — SAMPLE SPOOLS of any type of Textilene filler to demonstrate the superiority of Twitchell materials in your operation—also technical counsel without cost or obligation. Just tell Twitchell your end-use requirements. *Write, wire, or phone today:*

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Even if those Apco Mossberg Reels do fall, they won't be damaged because of their all-steel construction. They're designed and manufactured to close tolerances too, so you will have no worries about breakage, tapping or wire waste.

With Apco Mossberg Reels and Spools, machine downtime and maintenance are at a minimum.

Fifty years of experience behind these reels assure smooth spool-out at high speeds. For additional information, write, wire or call collect.

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Toronto, Ontario, Canada

APCO MOSSBERG COMPANY
LAMB STREET, ATTLEBORO, MASSACHUSETTS

The company employs approximately 1200 people and will be continued as a separate unit within the ITT System, with personnel, policies and identity unchanged and with Mr. Surprenant serving as Chairman of the Board of the subsidiary.

NEMA Sets Annual Meeting Date

NEMA's 35th Annual Meeting will be held on November 16, 1961, in New York City, probably at the new Summit Hotel, which is expected to be completed in June.

* * *

The Wire and Cable Division met at the Westchester Country Club in Harrison, N. Y., on April 20-22 and the Insulating Materials Division at Hot Springs, Va., on June 3-6. The Wire and Cable Division was addressed by **Irving Lipkowitz,** Director of Economic Research, **Reynolds Metals Co.,** who spoke on "The Import Picture."

* * *

Four standards were published by NEMA in 1961. These are: MW 5 Single, Heavy and Triple Polyester Coated, MW 7 Ceramic Silicone Coated. MW 8 Ceramic Polytetrafluoroethylene Coated. MW 10 Single, Double, Triple and Quadruple Polytetrafluoroethylene Coated. Each covers coating, packaging, joints, dimensions, tests, and retests.

Nail Firm Moves Into New Plant

Spotnails, Inc., formerly of Evanston, Ill., has announced its removal to a new plant located at 1100 Hicks Road, Rolling Meadows, Ill., on March 15, 1961. It is on Route 53, two miles north of the Northwest Tollway.

* * *

The new plant, with two acres of floor space under one roof, has enlarged facilities. Those interested in operations of this kind are cordially invited to visit Spotnails' new plant.

Get the habit of reading regularly
WIRE AND WIRE PRODUCTS
The Wire Man's Magazine

Joint Infrared Micrometer Announced for Steel Mills

Dr. R. Bowling Barnes, president of **Barnes Engineering Company,** Stamford, Conn., and **Philip M. Morgan,** president of **Morgan Construction Company,** Worcester, Mass., have announced that they have agreed to develop applications for the Barnes Infrared Micrometer in connection with gauging problems in rod and bar mills.

* * *

The Infrared Micrometer detects the sharp thermal discontinuities at the two edges of hot steel rods, and without making physical contact, converts the radiation received into precise and continuous linear measurements.

* * *

According to Mr. Morgan, "extensive field tests in a steel rod mill confirm that the Infrared Micrometer can successfully determine the outside diameter of red hot rods or bars as they are delivered at high speed from a rolling mill." This is a departure from the conventional method currently used, namely manually gauging bars or rods immediately following the rolling operation and while the product is still at elevated temperatures.

Leaflet on Wire Furnaces

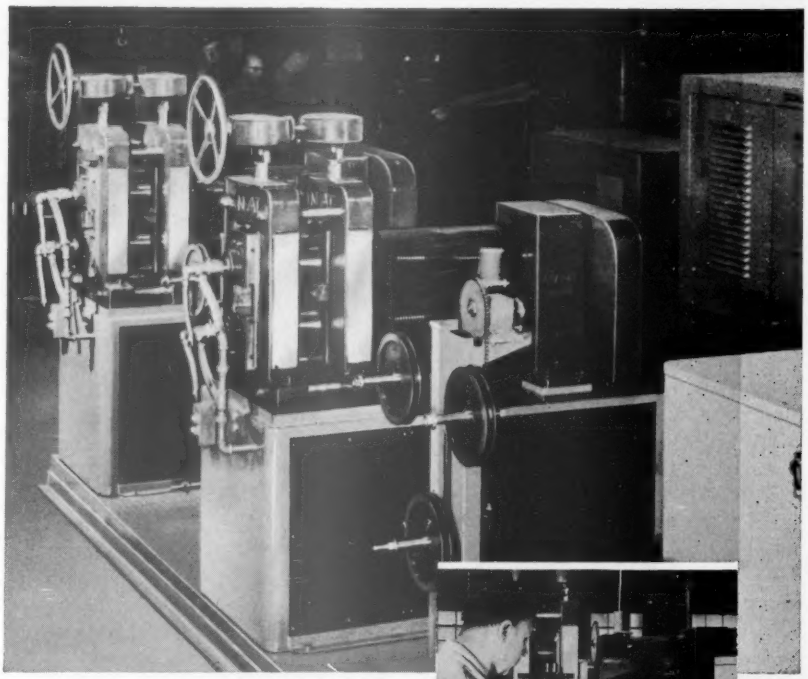
Lee Wilson Engineering Co., 20005 W. Lake Rd., Cleveland 16, Ohio, has issued a leaflet, "Modern Production Advances in Rod and Wire Processing", illustrating galvanizing equipment, bell-type, convection, coil spheroidizing, slug spheroidizing and oil tempering furnaces. Copies are available on request to the company.

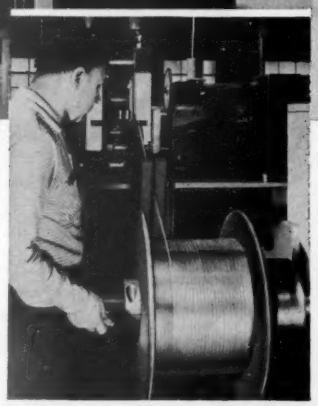
Bulletin on D-Pak Line

The Coulter & McKenzie Machine Co., 35 Union Ave., Bridgeport 7, Conn., pioneers in the development of draw-pak equipment for packaging wire, has issued an eight page bulletin covering a new line of D-Pak equipment for fine wire.

* * *

A feature of this line is constant controlled tension, from the use of





HIGH PRODUCTION *Wire Flattening* **MILLS**

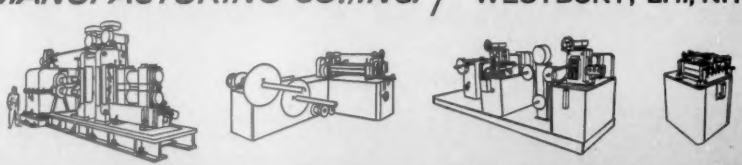
Now you can get extremely close tolerances combined with high speed production, with Stanat Wire Flattening Mills. These Stanat mills can be used to produce a wide variety of flat and shaped wire.

Designed to offer maximum flexibility of operation and arrangement, Stanat mills are available either as completely self-contained package units or as individual components for erection at your plant.

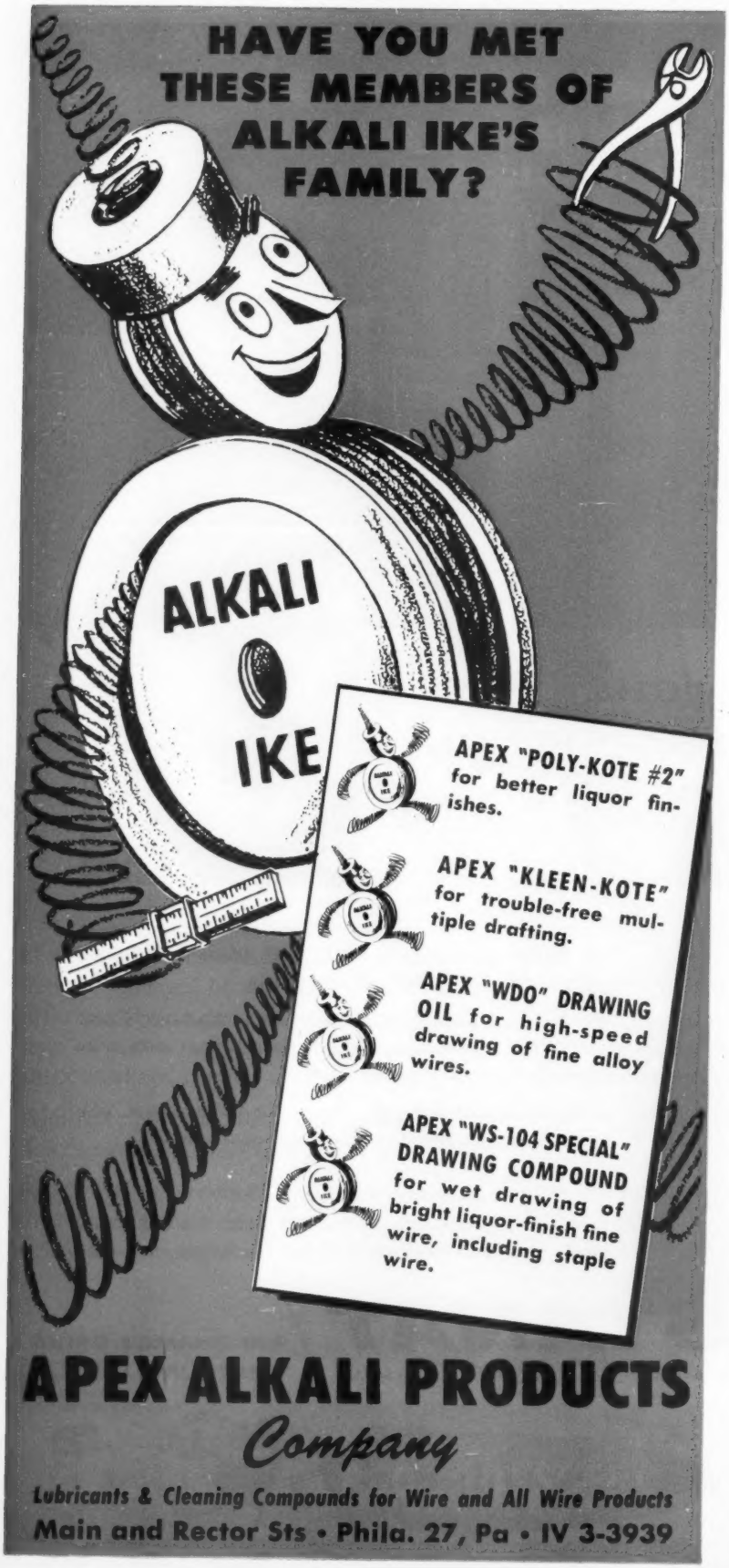
Stanat wire mills are available in 4", 6", 8" and 10" roll diameters, with optional equipment to fit your individual production requirements.

■ Find out how you can get increased production and greater profits with Stanat Wire Mills. Write today for further information.

STANAT MANUFACTURING CO., INC. / 500 SHAMES DRIVE WESTBURY, L. I., N.Y.



MFR'S OF ROLLING MILLS, GANG SLITTERS, WIRE FLATTENING MILLS, ROLLER LEVELERS AND BULL BLOCKS


HAVE YOU MET THESE MEMBERS OF ALKALI IKE'S FAMILY?
ALKALI
IKE
APEX "POLY-KOTE #2" for better liquor finishes.
APEX "KLEEN-KOTE" for trouble-free multiple drafting.
APEX "WDO" DRAWING OIL for high-speed drawing of fine alloy wires.
APEX "WS-104 SPECIAL" DRAWING COMPOUND for wet drawing of bright liquor-finish fine wire, including staple wire.
APEX ALKALI PRODUCTS
Company
Lubricants & Cleaning Compounds for Wire and All Wire Products
Main and Rector Sts • Phila. 27, Pa • IV 3-3939

a 360° clamp device that assures constant tensioning for uniform pay-out of wire.

* * *

D-Pak 500 is designed for use on the standard 500 lb. container, 20″ in diameter by 30″ high, or the 250 lb. fiber drum, 20″ in diameter by 15½″ high. It can be used for the coil winding of magnet wire, feeding steel or aluminum wire to flattening mills, as a pay-out to spring coiling machines, or other high-speed applications. Tangle-free instantaneous stops and starts are possible.

* * *

Other D-Paks are covered, the Floor Type 40-A and the Attachment Types 100 and 40. Each is pictured, described and accompanied with a line drawing providing details. All accessory equipment and parts are similarly described.

For a copy, write the company asking for Bulletin No. 10.

SKF To Develop Special Machines At Maryland Site

A $1 million facility for manufacturing research and development of special types of bearing production machinery will be built in Kilmarnock Industrial Park (north of Towson, Baltimore County), Maryland, **Karl Kesselring,** vice president of production, **SKF Industries, Inc.,** has announced.

* * *

The function of this new unit is to develop and produce special ball and roller bearing manufacturing machinery and production methods to effectively combat foreign competition through improved production operations.

* * *

Special equipment and techniques developed by this activity will be used in SKF production plants, enabling the company to maintain the most modern rolling contact bearing production machinery and techniques in a highly competitive industry.

* * *

SKF Industries has 10 plants. Three are in Philadelphia. Others are in Kulpsville, Shippensburg, and Altoona, Pa.; Hornell, N. Y.; Massillon, Ohio; Asheville, N. C.; and Los Angeles, Calif.

Outstanding Personalities of the Wire Industry

Riverside-Alloy Appoints Hunt To New York Office

William J. Hunt, formerly with **Carpenter Steel Company,** has joined the New York office of **Riverside-Alloy Metal Division,** H. K. Porter Company, Inc. He will serve customers in the Metropolitan area.

* * *

Mr. Hunt, 37, is an honor graduate of Lehigh University, where he majored in history and economics. He has also received a masters degree in marketing management from Rutgers University. Before joining Riverside-Alloy in March, Mr. Hunt had been a sales representative for Carpenter Steel Company for 10 years.

Chemical Products Appoints Two Directors

Hugh B. Allison and **Joseph S. Hawes** have been elected to the board of directors of **Chemical Products Corporation,** East Providence, R. I. Mr. Allison joined Chemical Products in 1948 and has served since 1957 as vice president in charge of Chem-o-sol sales, responsible for the company's line of industrial PVC coating, molding and gasketing materials. Mr. Hawes has been with the company since it absorbed the New England Lacquer Company and in 1957 was appointed vice president in charge of Nelco lacquer sales, handling textile, electrical and metal coatings produced by the company.

Hugh B. Allison Joseph S. Hawes

Jarke Appointed President Rack Manufacturer's Institute

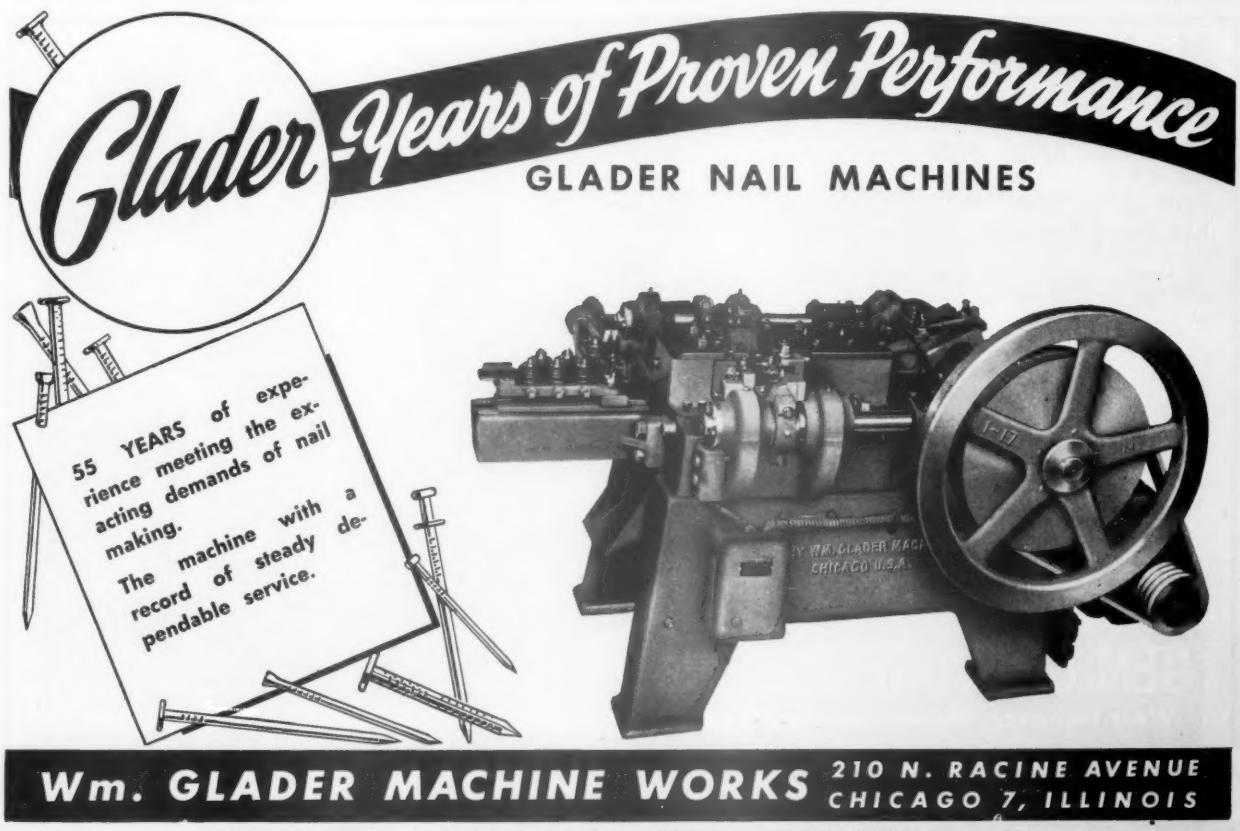
D. W. Jarke, President of **Jarke Manufacturing Company,** Niles, Illinois, manufacturers of Industrial stock storage systems and material handling equipment, has recently been appointed President and Chairman of the Board of the **Rack Manufacturer's Institute.**

Union Carbide Plastics Appoints Appointments Representative

W. Warren Swenson has been appointed a Special Representative in the Metropolitan New York Sales Region of **Union Carbide Plastics Company,** Division of Union Carbide Corporation, with offices at 115 Bloomfield Ave., Clifton, N. J.

* * *

Mr. Swenson was graduated from


Glader-Years of Proven Performance
GLADER NAIL MACHINES
55 YEARS of experience meeting the exacting demands of nail making.
The machine with a record of steady dependable service.
Wm. GLADER MACHINE WORKS
210 N. RACINE AVENUE
CHICAGO 7, ILLINOIS
EXPORT DEPT. 122 EAST 42ND STREET -:- NEW YORK 17, N. Y.

Muhlenberg College in 1944 with a Bachelor of Science Degree in Chemistry. He joined Union Carbide Plastics Company in 1947.

* * *

George H. Dougherty, Jr. has been appointed a Technical Representative in the Mid-Western Sales Region with offices at 230 North Michigan Avenue, Chicago 1, Ill. He graduated from Lafayette College in 1960 with a Bachelor of Science Degree in Chemical Engineering and a Bachelor of Arts Degree in Mathematics and joined Union Carbide Plastics in June, 1960.

* * *

E. Warner Emmens has been named Office Manager of the Metropolitan New York Sales Region. His headquarters are at 1051 Bloomfield Ave., Clifton, N.J. He attended Brooklyn Polytechnic Institute prior to joining the company in 1942.

* * *

Thomas T. Spooner has been assigned as a Technical Representative in the South Atlantic Sales. He is a graduate of Cornell University with a Bachelor of Science Degree in Chemical Engineering. His office is located at Pleasant Valley Rd., Moorestown, N. J.

Appointed Sales Engineer

The American Laubscher Corporation of New York has announced the appointment of **Robert Zeuke** as Sales Engineer. Prior to joining American Laubscher, Mr. Zeuke was connected with the **Niehoff Machine Works** of Schwabach/ West Germany, manufacturers of wire drawing equipment, represented in the USA by the American Laubscher Corporation.

Robert Zeuke

Hunter Spring Appoints Two To Quality Control Positions

The appointment of **C. J. McClintock** as Manager of Quality Control and Inspection and **Benjamin S. Seward** as Manager of Quality Assurance is announced by **P. C. Clarke,** Vice President and General Manager of **Hunter Spring Company,** a Division of American Machine & Metals, Inc. Lansdale, Pa. According to Mr. Clarke, both appointments are a part of the company's reorganization and strengthening of the quality control function.

* * *

In his new position, Mr. McClintock will be directly responsible to the General Manager of the division. He was formerly Chief Inspector at Hunter.

* * *

Mr. Seward will be responsible to

Marking Machines, Wheels & Inks

FOR INSULATED WIRE, TUBING AND PIPE—

Type AM — Illustrated has these features:

1. FINE VERTICAL AND HORIZONTAL ADJUSTMENTS PROVIDE PERFECT MARKING ON WIRES OF .010" TO 3.00" IN DIAMETER.
2. ACCOMMODATES FLAT, CONCAVE, OR SPECIAL WHEELS.
3. CAN BE DRIVEN BY ELECTRIC MOTOR OR SELSYN TRANSMITTER AND RECEIVER TO INSURE PERFECT PRINTING WITH MINIMUM PRESSURE.

Actual Production Photo of Type AM

Horizontal Adjustment

GEM GRAVURE CO., INC.
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CABLE ADDRESS: GEMGRA
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IN THE MARKING OF EXTRUDED MATERIAL THERE ARE BIG ADVANTAGES IN ONE SINGLE SOURCE OF SUPPLY.
KNOW-HOW • INKS • WHEELS • MACHINES

West Coast Representative: Paul I. Kenner Co., 230 Shaw Rd., So. San Francisco, Calif.
West Germany: Walter G. Fritzke GMBH, AM Wehrhahn 94-96, Dusseldorf, W. Germany
Warbrick Engineering Specialties Limited, Barclays Bank Chambers, Sanky Street, Warrington, England.

the Manager of Quality Control and Inspection for quality control systems and procedures, training and records. Previously he was quality control manager for the Turbo Machine Co., Lansdale.

Allegheny Ludlum Appointments

Two important management appointments have been announced by **Allegheny Ludlum Steel Corporation,** affecting the firm's international company and its two steelmaking plants in New York state.

* * *

W. R. Breeler, General Manager of Allegheny Ludlum's plant at Dunkirk, N. Y., since 1945, has been named President of Allegheny Ludlum International, S.A., with headquarters in Geneva, Switzerland, effective July 1. As head of the International company, Mr. Breeler will have an interest in both sales of Allegheny Ludlum products outside the United States and in the construction and operation of the Allegheny-Longdoz plant near Liege, Belgium.

* * *

A. H. Hanks, Manager of the Corporation's Watervliet, N. Y. Works since 1952, has been named General Manager—Bar, wire and Tube Production, effective May 1. In his new capacity, Mr. Hanks will be responsible for the operation of both the Dunkirk and Watervliet plants.

Rockbestos Appoints District Manager

Rockbestos Wire & Cable Company, Division of Cerro Corporation, New Haven, Conn., announces the appointment of **Edward J. Parker** as Sales Manager of their Southeastern District, with headquarters to be established in Birmingham, Alabama.

* * *

Except for a short period of time, Mr. Parker has been associated with Rockbestos as Sales Manager of their St. Louis District. He is a graduate of Merchant Marine Academy in Kingsport, Long Island, N. Y., with a degree in Mechanical Engineering.

Wentz To Manage Reynolds New Electric Wire Plant

Charles R. Wentz, a veteran of 30 years' experience in wire and cable manufacture, has been named manager of Reynolds Metals Company's new plant at Chester, Pa.

* * *

This plant will produce insulated wire and cable for the electrical conductor market. Mr. Wentz formerly was plant manager for electrical wire at **John A. Roebling's Sons Division,** Colorado Fuel and Iron Corporation, Trenton, N. J.

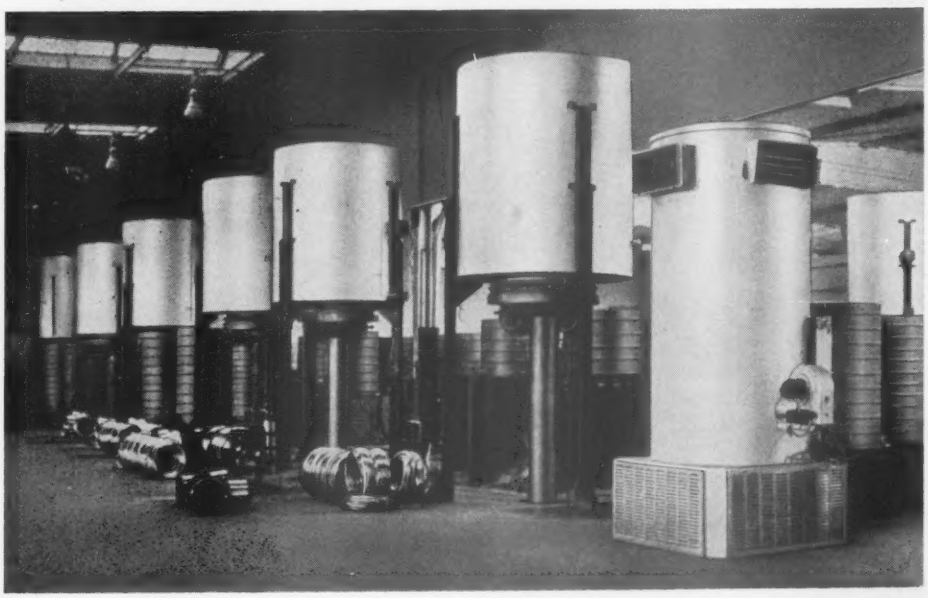
* * *

Mr. Wentz graduated from Lehigh University with a degree in metallurgy in 1930. He had been with the Roebling organization for 30 years, and directed electrical wire production for the last 10 years.

Battelle Appoints Associate Director

Dr. John F. G. Hicks has been named associate director of **Battelle Memorial Institute, Dr. B. D.**

Now also for Stainless and Chrome-Nickel!



FRITZ - VACUUM FURNACES HELP TO SOLVE YOUR ANNEALING PROBLEMS.

(German and Foreign Patents)

★

SOLE REPRESENTATIVE:

PAUL REICHER
Machinery & Equipment
600 Eglinton Ave., East,
Toronto 12, Ont., Canada

WRITE TO: FRITZ INDUSTRIAL FURNACES HAGEN, P. O. B. 448 (W.-GERMANY)

Thomas, president, has announced.

* * *

Formerly vice president of the Corning Glass Works and vice president and technical director of Corning Glass International, Dr. Hicks is a chemist with broad experience in industrial research and development and in corporate management. He is a former National Research Fellow and Research Associate at Massachusetts Institute of Technology.

* * *

Dr. Hicks was graduated from the University of Washington with a B.S. degree and an M.S. degree in chemistry in 1931. He was awarded a doctorate in physical chemistry by the University of California in 1933. He held teaching fellowships at both universities and, as a National Research Fellow, was engaged in chemical research at Massachusetts Institute of Technology prior to his association with Corning.

Chase Joins Mason Instrument

The appointment of **William C. Chase** as sales manager for the photoelectric controls and radiation pyrometer controllers designed and manufactured by the company has been announced by **Mason Instrument Co., Inc.**, Mamaroneck, N. Y.

* * *

Prior to joining Mason Instrument, Mr. Chase had considerable experience in the industrial and military applications of radiation and gaging techniques. He has received intensive training supplementing his previous experience and qualifying him to advise and assist in the selection of proper instrumentation in this field. Mr. Chase holds a degree in engineering from Yale University.

Changes at CF&I's Pueblo Mills

Rudolph Smith, Works Manager of the **Colorado Fuel & Iron Corporatin's** Pueblo plant has announced two personnel changes.

* * *

As a result of the retirement of **Victor W. Johnson** as Superintendent of the rolling mill and finishing departments, **Harold V. Gumma** has been promoted from Assistant Superintendent of the department to Superintendent. His new assistand is **Delbert W. Yarberry.**

* * *

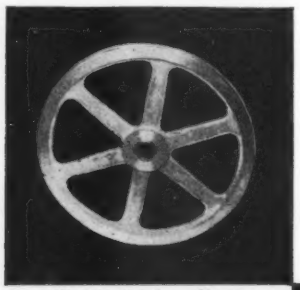
Mr. Gumma, who joined CF&I in 1937, is a graduate of the Colorado School of Mines and holds a degree of B.S. in Metallurgical Engineering. Mr. Yarberry, joined CF&I in 1928. He attended Colorado State University. Mr. Johnson, a veteran steel man with experience in many departments, had been on the job with CF&I for 55 years.

* * *

Roy W. Randolph, General Foreman of the Merchant Rolling and Finishing Department, has been made Assistant Division Superintendent of these units.

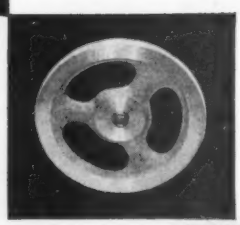
* * *

In his place, **James E. Bowman, Jr.**, has been made General Foreman. And **Joe W. Krasovich** has been named Division Superintendent of the rail mill, 40-inch mill, rod mill and conditioning unit at Pueblo.



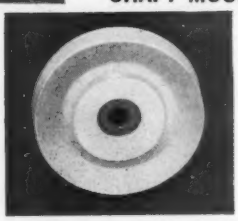
ALUMINUM SHEAVES

These Watkins Aluminum Sheaves offer outstanding advantages of ease of maintenance and long service life when used in gangs to guide wire through enamelling ovens and related equipments. Each sheave is machined from an aluminum casting. Large sheave is available with single or double groove.



	SMALL	LARGE
V-GROOVE ROOT DIA.	3¾"	8"
SHAFT SIZE	¼"-⅜"-⅜"	⅝"
WIDTH	¼"	7/16"
SHAFT MOUNTING	Oiled bushing	Needle bearing

NYLON IDLER PULLEY



The Watkins Nylon Idler Pulley combines the resiliency, high strength and low weight of nylon with the free-turning ball bearing to give outstanding performance wherever pulleys are used in fine wire drawing machinery.

SIZE: 1½" O.D. x 5/16" Wide
SHAFT SIZE: 3/16" Diameter
STYLE: Single groove, Double groove

Other styles available to suit individual application.

RWS WIRE MACHINES

Descriptive literature is available. Inquiries are invited.

R. S. WATKINS & SONS, INC. Glen Road, Sandy Hook, Conn.

At the same time **James E. Lytle,** Buffalo Works Manager, announced the appointment of **James D. Walder** as Supervisor of the Buffalo Plant Order and Scheduling Department.

Victor Wire & Cable Plans Expansion

Victor Wire and Cable Corp., 5700 Venice Blvd., Los Angeles 19, Cal., which in 7 short years has developed into a leading Western fabricator of specialty wire and cable for electronics, missiles and aircraft, is now being headed by a new president, **Leon Feldman.**

* * *

Mr. Feldman proposed no changes in corporate personnel or policy. He pointed out that "Victor has attained a unique position in the West" because of its ability to fabricate wire and cable to virtually any specification. He also emphasized "the fact that we can process these special requirements for one to two weeks delivery" and noted that Victor maintains an inventory of some 10,000,000 ft. of military spec wire.

* * *

Victor is now planning for an expanded factory and warehouse facility. It will include the most modern equipment and testing procedures for all custom and military spec wire. Victor's facilities have just been augmented with equipment for coating wire and cable with high temperature Teflon.

* * *

The company maintains sales offices in San Francisco, San Diego, Seattle and Phoenix. It also represents the **Times Wire & Cable Division** of The International Silver Company and maintains stocks of that company's standard wire and coaxial cable.

Leon Feldman

Crucible Steel Appointments

John E. Holt has been appointed Assistant to the Vice President—Operations, Production with Crucible Steel Company of America. He was formerly Division Superintendent—Flat Rolled Products at the Company's Midland (Pa.) Works.

* * *

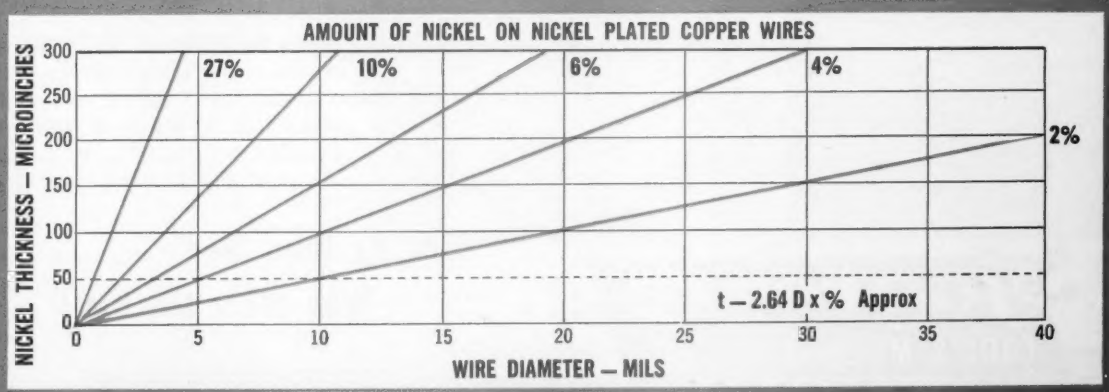
Mr. Holt joined Crucible in 1943 as Assistant Manager of the D.P.C. Department at the Midland plant. He became Superintendent of the Forge Stock Department the following December and in 1956 he was named Superintendent of the 24-Inch Bar Mill. He was promoted to Assistant Division Superintendent of the Flat Rolled Products Division in 1958 and Division Superintendent in 1959.

Your First Source For NICKEL PLATED COPPER WIRE

TO: ASTM-B-355-60T • MIL-W-16878D • MIL-W-27300

As a principal supplier of nickel-plated copper for the high temperature wire industry, HUDSON produces conductors to all military and industrial specs. Many constructions — with the "standard" platings shown on the chart below — are available from stock. Others can be produced on short notice.

With our modern plating facilities, HUDSON is continually setting industry standards for the highest quality wires at the most competitive prices. Contact us today for our published price list. And let us quote on your special constructions.



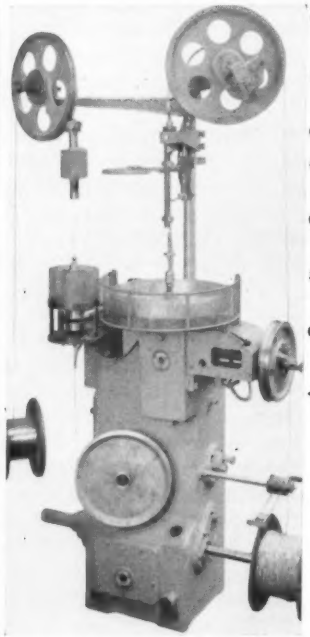
For additional information on stranded and single-end conductors — bare and plated — write to:

HUDSON WIRE COMPANY

OSSINING DIVISION, OSSINING, NEW YORK / TELEPHONE: WILSON 1-8500

FOR TELEPHONE CABLES

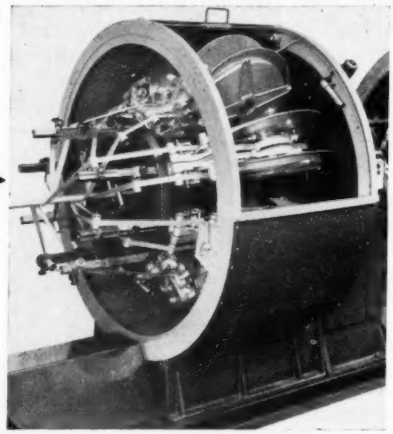
High speed insulating machines



- Paper spindle at 3000 r.p.m.
- String spindle at 8500 r.p.m.
- Paper disc 300 mm
- Traversing take-up reel
- Predeterminating counter
- Automatic stop motion
- 1000 units actually running

FOR HIGH VOLTAGE CABLES

Taping head with 16 papers



- Constant tension braking
- 500 mm paper disc diameter
- Automatic stop motion
- Moveable paper disc for cable diameter variations
- Speed 100 to 350 r.p.m. with speed changer
- Adjustable die

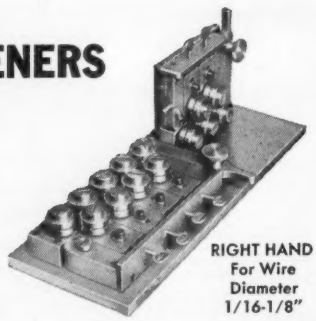
POURTIER MACHINES

76 à 82 rue de la Fraternité

ROMAINVILLE (Seine) FRANCE

SALES AGENT FOR NORTH EAST STATES: WEMPUMPS, 1168 South Olden Ave., Trenton 10, N.J. (U.S.A.)

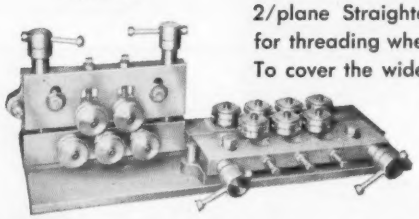
Sjogren 2 PLANE ROLL STRAIGHTENERS



RIGHT HAND For Wire Diameter 1/16-1/8"

Sjogren Two Plane Roll Straighteners are fully ball bearing for heavy production duty. They are designed to accommodate all sizes and grades of round or shaped wire whether it be high carbon, low carbon or copper, as well as the many alloys, from .010" to .375". Once set for the job at hand Sjogren 2/plane Straighteners may be opened and closed for threading when making coil changes without effecting the adjustment of the setting. To cover the wide range of wire diameters there are several size groups manufactured with either left or right hand direction. Each is individually produced to exact specifications for the grade, size and type of wire to be processed. Sjogren Two Plane Roll Straighteners do their duty each day, every day in the year.

LEFT HAND For Wire Diameter 3/16-3/8"



Used by Wire Men Who Want the Best!

Sjogren SINCE S&S 1927

TOOL & MACHINE CO., INC.

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

14 SWORD ST. • AUBURN, MASS.

Also promoted was **Bruce O. Young**, who has been named Manager, Carbon and Alloy Specialties Product Division.

* * *

Mr. Young has been associated with Crucible since 1956 when he joined the Company as Market Development Coordinator with the Carbon and Alloy Specialties Division. He will now be responsible for the promotion and sale of Drill Steels, Alloy and Carbon Specialties, Jail Steels, Agricultural Steels and Cold Rolled Specialties. He attended St. Joseph's College and Temple University where he studied Business Administration and Metallurgy.

* * *

William G. Hassel has been appointed Manager of Tonnage Products Division. He was formerly Manager of Carbon and Alloy Product Division. Mr. Hassel was graduated from the Pennsylvania State University with a B.S. Degree in metallurgical engineering.

Pittsburgh Steel Appointments

Pittsburgh Steel Company announced, effective April 1, 1961, the appointment of **Henry H. Passolt** as Superintendent of the Monessen Finishing Operations. The announcement was made by **E. A. Dawson**, Monessen Works Manager.

* * *

Johnson Steel & Wire Company, a Pittsburgh Steel Subsidiary, also announced the appointment of **John H. Gaucher** to succeed Mr. Passolt as Chief Metallurgist of this Company, according to **J. H. Greenaway**, Manager of Operations at Johnson Steel & Wire.

* * *

Mr. Passolt, a graduate in Metallurgy, of the University of Michigan, was formerly an employee of the **Page Steel & Wire Division** of American Chain & Cable Company as Wire Mill Superintendent there. He occupied this position when he left to join the Johnson Steel & Wire Company in 1951 as Chief Metallurgist.

* * *

Mr. Gaucher, a graduate of Clark University, has been with Johnson Steel & Wire Company since 1942 serving in various chemical and metallurgical capacities. For the past 9 years he has held the position of Sales Engineer.

Expands Annealing Facilities

With the installation of a new, completely-automatic furnace, the annealing facilities were expanded and improved at the Alloy plant of **Riverside-Alloy Metal Division, H. K. Porter Company, Inc.**

The furnace, which will be utilized for Monel and Nickel redraw rod, features excellent control to assure top quality annealing. An elaborate control board on the new equipment enables the operator to operate the furnace simply by pushing buttons. A series of conveyors teams up with these controls to provide a continuous flow of metal.

Another Development ... by Hubbard!

PLYWOOD MARRIES STEEL

FOR BETTER SHOP REELS

RESULTING IN

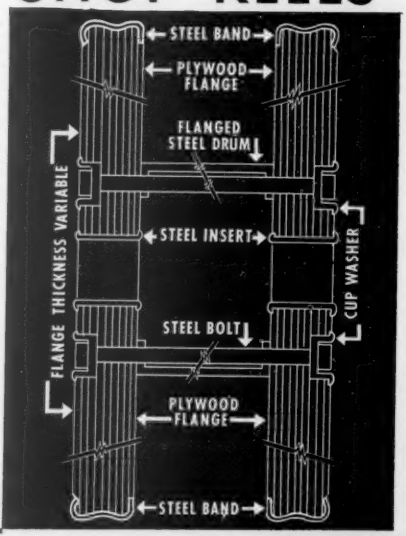
1 GREATER IMPACT STRENGTH

2 LOWER MAINTENANCE COSTS

3 LIGHTER WEIGHT FOR EASIER HANDLING

4 CAN BE SUBMERGED IN WATER

5 WIDE RANGE OF SIZES



LOWER INITIAL COST

FOR DETAILS CONTACT

HUBBARD SPOOL DIVISION

Van Norman Industries, Inc.

GARRETT, INDIANA

A Review of Recent Wire Patents

The data listed below is only a brief review of recent patents pertinent to the readers and subscribers of this publication.

Complete copies of these patents may be obtained by writing to the publisher of this magazine and remitting 50¢ for each copy desired. For orders received from outside the United States the cost will be $1.00 per copy.

No. 2,977,747, CABLE-GUIDED MECHANISM FOR CABLE-STRANDING APPARATUS, patented April 4, 1961 by Axel C. Nystrom, Rutherford, N. J., Lester O. Reichelt, Downers Grove, Ill., Daniel V. Waters, Lebanon, N. J., and John R. Weigel, Elmhurst, Ill., assignors, by direct and mesne assignments, to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

A composite guide tube is provided, mounted on a rotating cradle of the apparatus for receiving the cable as it enters the cradle and guides it to a distributor and thence onto a take-up reel on the cradle.

* * *

No. 2,977,748, LUBRICATED WIRE ROPE, patented April 4, 1961 by William A. Zisman, Silver Spring, Md., and Vincent G. FitzSimmons, Washington, D. C.

This rope comprises a number of ferrous metal multiwire strands laid about a core in which the individual wires of the rope are coated with a plural-layer thin film of sintered polytetrafluoroethylene, having a thickness of from about 0.1 to 1 mil.

* * *

No. 2,977,834, SHEARING APPARATUS FOR CHICKEN WIRE OR THE LIKE INCLUDING A TOOTHED, PIVOTED WIRE GUIDE, patented April 4, 1961 by Cezar Tyjewski, 702 Emmett St., Battle Creek, Mich.

A toggle-action operated knife is employed in the cutting while the wire mesh is held against backward movement at the end of the cutting operation.

* * *

No. 2,978,023, FOURDRINIER MACHINE BELT, patented April 4, 1961 by Howard M. Helland, Newfane, N. Y., assignor to Lockport Felt Company, Inc., Newfane, N. Y.

It is stated that the longitudinal tension forces acting on the belt, because of its filament weave pattern construction, are balanced laterally so the belt does not tend to pull to one side as it traverses the Fourdrinier machine rolls.

* * *

No. 2,978,193, WINDING MACHINES, patented April 4, 1961 by Rudolph J. Kelly, Smithtown, N. Y., assignor to Sperry Rand Corporation, Great Neck, N. Y., a corporation of Delaware.

No shuttle is used on this closed-core windings (toroids) machine and the wire strand material is released, turn by turn, from the storage skein automatically and under a predetermined tension without manual intervention.

* * *

No. 2,978,194, MEANS FOR CONTINUOUSLY SPOOLING FILAMENTARY BODIES, patented April 4, 1961 by Edward Thompson Lloyd, New Eltham, London, and Henry Kenneth Holderness, Gravesend, England, assignors to W. T. Henley's Telegraph Works Company Limited, London, England.

More specifically, the machine disclosed is for continuously spooling relatively thin wire (4/1000 to 12/1000 of an inch) in conjunction with, for example, slip-type wire drawing machines. Nine claims.

* * *

No. 2,978,196, WIRE TENSION CONTROL DEVICE, patented April 4, 1961 by Clarence E. McCoy, Fairhope, Ala., and James F. Stoltz, La Grange, Ill., assignors to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

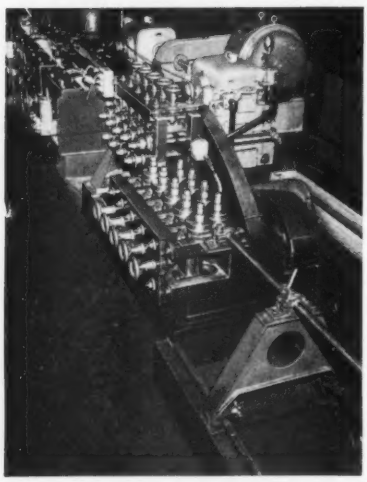
The control is adapted for detecting small variations in tension on a traveling wire and changing the angle of contact between the wire and a capstan in accordance with the tension variations so as to maintain a constant tension.

* * *

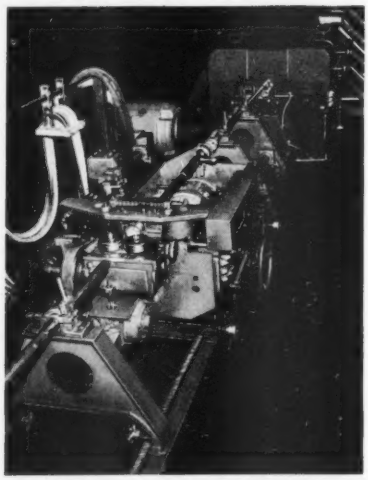
No. 2,978,530, CONDUCTOR FOR TRANSFORMER WINDINGS, patented April 4, 1961 by Fernand Braeckman, Nalinnes, Belgium,

LOMATIC

COMBINED DRAWING STRAIGHTENING CUTOFF AND POLISHING MACHINE



Payoff - Drawbench - Straightener



Flying Shear - Polisher - Discharge

Now available in two standard sizes, the revolutionary LOMATIC machines handle ferrous and non-ferrous rods and tubes at speeds up to 200 ft. per min. and with drawing capacities up to 16,000 lb. Compared to conventional separate rod drawing, straightening, polishing and cutting-to-length operations, the LOMA single-operation fully automatic machine offers the following major advantages:

- Greater output rate — continuous operation at high speed
- Reduced labor cost — only one operator required
- Improved straightness — stock is straightened in two planes
- Perfect concentricity — obtained by straight-line drawing action
- Higher surface finish — due to two-stage polishing unit

The complete line comprises an uncoiler, a pre-straightener, a drawbench, a roller straightener, a flying cutoff, a polishing machine and a discharge table. All components required for the complete sequence of processing operations are interlocked mechanically and electrically into one integrated and synchronized line which is controlled by only one operator.

Our standard line of equipment includes:

- Casting Machines and Molds
- Saws and Cut-off Machinery
- Hot and Cold Rolling Mills
- Rod and Tube Draw Benches
- Roller and Stretcher Levellers
- Air and Hydraulic Tube Testers

LOMA
MACHINE MFG. CO., INC.
114 East 32nd Street
New York 16, N. Y.

assignor to Ateliers de Constructions Electriques de Charleroi, Brussels, Belgium, a corporation of Belgium.

The multi-strand conductor is formed into a rectangle. The wires of the peripheral strands occupy all positions radially and, hence, they are all subjected to the same average stray field.

* * *

Reissue No. 24,964, FURNITURE FRAME CONSTRUCTION, patented April 11, 1961 by Charles Eames, Venice, Calif., assignor to Herman Miller, Inc., a corporation of Michigan.

A chair frame is disclosed comprising longitudinal wires and transverse wires having portions welded in crossed relation to form a body-supporting mesh with portions of the mesh deformed to provide in effect a body supporting member of inherent curved contour, and an upper rim wire welded to the upper surfaces and a lower rim wire welded to the lower surfaces of end portions of the longitudinal and transverse wires.

* * *

No. 2,978,860, WIRE ROPES, patented April 11, 1961 by Robert Edward Campbell, Doncaster, England, assignor to British Ropes Limited, Doncaster, England.

A multi-layered steel wire rope is disclosed, characterized in that the king wire is faceted according to the number of wires in the first layer over it, and the wires of the intermediate layer are individually of polygonal section, the wires of the outer layer being that of a keystone with a arcuate head.

* * *

No. 2,979,084, WIRE SPREADING MACHINE, patented April 11, 1961 by Henry W. Roeber, Emporium, Pa., assignor, by mesne assignments, to Sylvania Electric Products, Inc., Wilmington, Del., a corporation of Delaware.

An automatic machine is disclosed for grouping, bunching, orienting, straightening and stretching the wire leads of vacuum tubes. There are sixteen claims.

* * *

No. 2,979,242, EGG CRATE, patented April 11, 1961 by Robert L. Van Huis, Holland, Vernon G. Linnabary, Jackson, and Kenneth G. Clark, Parma, Mich., assignors to The Automatic Poultry Feeder Co., Zeeland, Mich.

This crate is constructed mainly of wires providing rims, barred sides and bottom, with a multi strand wire handle at the upper end.

* * *

No. 2,979,736, SPREAD HOLDER, patented April 18, 1961 by Roger A. Kemman, 1818 Edan Court, Beloit, Wis.

For holding down bed spreads, the inventor provides a heavy wire formation mainly comprising a number of spaced-apart U-shaped wire members.

* * *

No. 2,979,794, WIRE OR CABLE BUNDLE TIE, patented April 18, 1961 by Francis De Bartolo, 11043 Braddock Drive, Culver City, Calif.

A clamping-type tie for securing (as a loop) about a wire bundle is provided.

* * *

No. 2,980,991, WIRE SPACING DEVICE, patented April 25, 1961 by Gerard A. Frank, Allentown, Pa., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

This is a device for spacing the free ends of pairs of wires held short of the free ends initially parallel with each other in relatively movable jaws of holders.

* * *

No. 2,981,225, WIRE INSULATION COLORING APPARATUS, patented April 25, 1961 by David E. Vatt, Moline, and Edward C. Dyer, Rock Island, Ill., and William L. Thompson, Bettendorf, Iowa, assignors, by mesne assignments, to The Gamewell Company, Newton, Mass., a corporation of Delaware.

A wire insulation color-spraying and drying chamber is disclosed having a pressurized color spraying system, with nozzles arranged in a helical pattern, and a vacuum scavenging system for excess spray together with a vacuum drying system.

* * *

No. 2,981,440, WIRE BOTTLE CARRIER, patented April 25, 1961 by Oscar G. Lilja, Rockford, Ill., assignor to Commercial Wire Products Company, Rockford, Ill., a corporation of Illinois.

By the wire arrangement, there are provided a gable top carrier having two upwardly-opening bottle compartments extending to the gable.

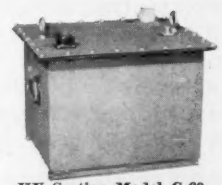
* * *

No. 2,981,788, POWER CABLES, patented April 25, 1961 by Stephen Bunish, Marion, Ind., assignor to Anaconda Wire and Cable Company, a corporation of Delaware.

About the spaced-apart wire power conductors are semi-conducting anti-corona and elastomeric polymetric insulation. There are also spaced-apart highly-conductive polymer cores with metallic ground conductors. There is also an elastomeric outer jacket.

CABLE HIPOT TESTER

- Smaller, lighter, less expensive
- Automatically limited maximum short circuit current (self-protecting)
- Cannot be injured by repeated short circuits
- Simplified controls for easy and rapid cable testing
- KV meter directly at output with field recalibration facilities
- Current meter in grounded return of HV output
- Meters protected against surges and overloads
- Continuously adjustable output voltage
- Selenium rectifiers for ruggedness and long life
- 5 ma current capacity



HV Section Model C-60

Control Section

The average DC Overpotential Tester designed for general purpose insulation testing is unnecessarily complicated and expensive for strictly cable testing.

Peschel Cable Hipots have been expressly designed for DC Overpotential Testing of cable (or capacitor charging). Although controls and circuitry have been simplified, safety features have not been sacrificed. Reliability has been enhanced by the elimination of current — interrupting devices. A short circuit merely collapses the voltage to zero and allows a current of 5 ma to flow. A cable failure is indicated by minimum voltmeter and maximum current meter readings.

SAFETY FEATURES • Zero start interlock • HV hold push button with provision to lock in: • External interlock provision • 2 piece construction for test cage use • Automatic output shorting • Grounded HV return • Controls and tank at ground potential • 3 conductor safety grounding input cord and plug • Shielded HV output cable • Surge limiting resistor in HV lead.

Model	Output Voltage KV DC Note 1	Output Impedance	CONTROL SECTION Size W x H x D	CONTROL SECTION Weight Lbs.	HV SECTION Size W x H x D	HV SECTION Weight Lbs. Note 2	Price
C 60	0 - 60	1 Meg.	14 x 8 x 8	20	13 x 12 x 11	90	$950
C 120	0 - 120	5 Meg.	17 x 9 x 11	25	10 x 24 x 16	190	$1750

NOTES:

1. For lower voltage units see Peschel Standard Hipot Testers, portable series "S".
2. Weight with oil, however, units are supplied and shipped less oil.
3. Input is 117V, 60 cps, 1 phase.

OPTIONAL EXTRAS AVAILABLE: Multi-range meters; one piece construction; line regulator; Center tap grounded unit for testing 2 conductor shielded or unshielded cable.

INQUIRE ABOUT OTHER TEST EQUIPMENT FOR THE WIRE AND CABLE INDUSTRY.

PESCHEL ELECTRONICS, INC.

PATTERSON. NEW YORK (Putnam County) Tel: TRinity 8-3251

Economical AC/DC Test Set

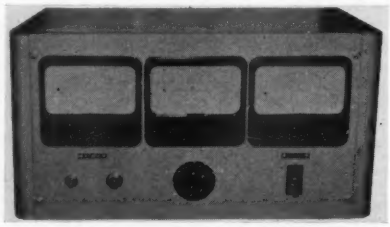
For voltages up to 1000 volts this low priced, high-capacity AC/DC Test Set Model KS1-50 features both AC & DC output channels with separate 4" voltmeters for AC rms and DC, plus a common AC/DC current meter.

* * *

Additional features include continuously adjustable output from zero to maximum; simplified control circuitry with main switch; pilot lamp, and high-speed circuit breaker selected for full capacity of test set; voltmeters directly across high voltage output for maximum accuracy; current meter in ground lead; all meters and controls at ground potential; in self-contained metal cabinet measuring 17" x 9" x 11" and weighing 30 pounds. A three conductor line cord and plug insure safety grounding of unit.

* * *

The current capacity is 50 ma. on AC and 25 ma. on DC. A heavy duty 100 ma. selenium rectifier promotes reliability and long life. The circuit breaker, with trip-free reset, protects the unit from overloads and short-circuits common in dielectric



breakdown testing. The simplified controls enable production testing by inexperienced personnel.

* * *

Made for lab or production dielectric testing in accordance with ASTM standards, or as general purpose power supply. For prices and additional details, write **Peschel Electronics, Inc.**, Towners, Patterson, N. Y.

Dodge Wire Opens Two New Warehouses

Dodge Wire Corporation has announced the opening of two new warehouses in Los Angeles and Philadelphia which will facilitate its plans for stepped up sales on a nation-wide basis.

* * *

One of the nation's leading producers of aluminum insect screening, the company now has warehouses and sales representatives coast to coast, according to **Wilmer B. Thompson**, company president.

* * *

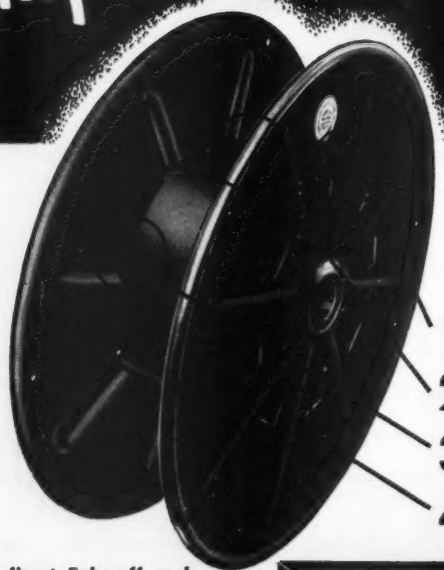
Mr. Thompson noted that the Los Angeles warehouse marks the opening of a totally new market for Dodge Wire, which previously had not been represented on the West Coast. The warehouse and sales offices located at 1340 East Sixth Street, will be headed by **Fred Wallin.**

* * *

The Philadelphia warehouse, located at 303 Chestnut Street, will

Important DIFFERENCES

BETWEEN JUST ANY REEL AND All Welded MPS



TAKE-OFF REELS

Three important differences that mean longer reel life in both processing and handling of all types of insulated wires in your plant.

1. **New** MPS **deep wide, straight type embossed radial rib** adds considerable strength to reel heads over the old style narrow tapered rib.
2. **Increased height of the curled edge** adds even more strength and rigidity, especially to the rims.
3. Furnished with **rib fillers** that are projections on the end of the barrels that fit into the embossed radial ribs thereby **eliminating any marking of the plastic or rubber insulated wires** at the junction of head-barrel.
4. Finally, the **all welded "J" type construction** of the entire reel completes the picture.

The finest Take-off reel you can buy.
We invite your inquiries — let us tell you more about MPS Take-off Reels. Write us today.

Mossberg PRESSED STEEL Corporation

"Division of Wanskuck Co."
18 West Street — Attleboro
Massachusetts U.S.A.
Telephone: CAstle 2-0847
109

be under the direction of **Dave Rudolph.** Other Dodge Wire warehouses are located in Miami, Fla., Charlotte, N. C., Cleveland, Ohio, Rock Island, Ill., New Orleans, La., and Freeport, N. Y.

* * *

At the same time the company announced the appointment of **Robert Tranchin** as its representative for Texas, Oklahoma, and Arkansas, with offices at 5526 Dyer St., Dallas, Texas.

"Cold Head for Happy Hearts"

Sketches and descriptions of typical cold headed specialties, products of **John Hassall, Inc.,** Westbury, Long Island, New York, are contained in the firm's new vest pocket booklet, "Cold Heads For Happy Hearts".

* * *

The 16 pages make light, easy reading for technical and purchasing people in metalworking, woodworking, plastics, electronic and all other fields using fasteners and small metal assembly parts.

"Cold Heads for Happy Hearts" is intended to familiarize readers quickly with many types of parts being cold headed by this 110-year old manufacturer.

* * *

Address inquiries to E. F. Karnes, Sales Manager, John Hassall, Inc., Westbury, L. I., N. Y.

New Concentrates For Magnetic Testing

A complete new family of materials for the wet method of visible and fluorescent magnetic particle testing has been introduced by **Magnaflux Corporation,** Chicago. This new concentrate is the result of a 30-year program of research to develop a method of locating invisible cracks in ferrous material and parts.

* * *

The new concentrates are in powder form and incorporate features superior to the previous Magnaflux and Magnaglo pastes. They are: easier mixing, handling, and storage; a measurable increase in fluorescent brilliance from 70% to 600%; closely controlled particle size range; less foaming; and more corrosion protection.

* * *

A noteworthy feature of the new concentrates is the ease with which a magnetic particle test bath can be prepared. Now, they can be added directly to the oil after measuring the proper amount in a graduated cup. A uniform suspension is obtained almost immediately. In other than small containers, the cost of concentrates per gallon of mixed bath is the same as the now-obsolete pastes.

* * *

Descriptive literature or field engineering consultation may be obtained by writing Magnaflux Corporation, subsidiary of General Mills, 7300 W. Lawrence Ave. Chicago 31.

New High Speed Wire Stripper

The new WR-6 Wire Stripper, manufactured by **High Speed Hammer Company** in Rochester, N. Y., has been specifically designed for

the latest HIGH SPEED
TUBULAR STRANDING MACHINE
from HANSON & EDWARDS . . .

. . . for the cable and wire rope industries.

* External wire guides increase efficiency—reduce "down-time"—provide quick, easy threading.
* Overall dimensions reduced—increased speed.
* Electro-mechanical or electrically operated air brakes to choice.
* Rotor runs in large split roller bearings.
* Direct gear-driven capstan gives positive lays.

19-12½ bobbin machine, one of the new models now in production. The capstan unit, with cantilever mounted haul-off sheaves, is a complete separate unit coupled by shaft and flexible coupling to the main machine.

HANSON & EDWARDS LTD
WARRINGTON ENGLAND

SALES ORGANISATION:
JAMES DAY (MACHINERY) LTD 28 MADDOX STREET LONDON W1

U.S. AGENTS:
THE EDMANDS COMPANY 860 WELLINGTON AVENUE CRANSTON 10, R.I.

P5078

resistance and magnet work and similar applications.

* * *

Of unique design, employing a minimum number of moving parts, this precision-made Wire Stripper is a rugged tool requiring little bench space. It is 8″ wide x 10″ deep x 6″ high with a net weight of only 15 lbs.

* * *

Two abrasive wheels instantly remove the wire coating with no damage to the conductor. Various density wheels are available to meet each and every requirement.

* * *

Specifications include a capacity of No. 32 through 50 A.W.G. wire. Mandrels are ¼″ diam. x ¾″ face.

* * *

Price includes one pair of wheels and one wheel dresser. Write High Speed Hammer, 313 Norton St., Rochester 21, N. Y., for details.

Improved KARMA Resistance Wire

Improved properties of Karma* fine resistance wire for precision resistors and potentiometers are described in a new Technical Information Bulletin, available from **Driver-Harris Company,** Harrison, N. J. With a new standard Temperature Coefficient of Resistance of ± 5 parts per million in fine sizes, the improved wire also shows greater stability of resistance.

* * *

The bulletin tells how linearity variation as low as 0.004% can be obtained from regular production lots, and how improved tensile strength permits higher efficiency in winding.

* * *

Two graphs illustrate the improved T.C.R. over a temperature range of −65 to +150 C and the improved stability of resistance at temperatures of 150, 200, and 300 C. Specifications in this alloy wire, available in sizes .00045 to .010, are listed for quick reference.

* * *

For copies of this Technical Information Bulletin, Number 102, write: Driver-Harris Company, Harrison 3, N. J.

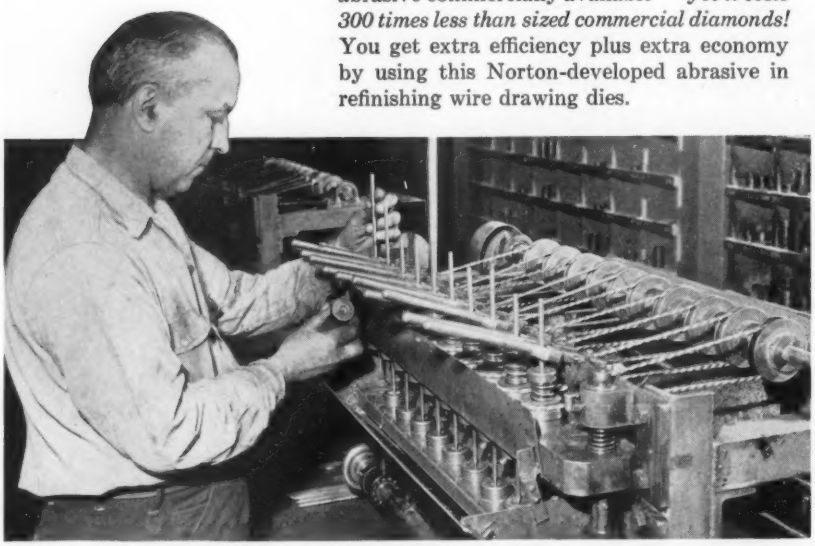
*Alloy 1B, ASTM B267-60T

*Reg. T.M. U.S. Pat. Off.

Next to diamonds in hardness...
First in economy...

NORBIDE abrasive for your die refinishing*

Next to diamonds and diamond dust NORBIDE grain is the hardest manufactured abrasive commercially available — yet *it costs 300 times less than sized commercial diamonds!* You get extra efficiency plus extra economy by using this Norton-developed abrasive in refinishing wire drawing dies.



NORBIDE grain can be used in liquid vehicle or compound form to bring high quality, steady savings to your die refinishing operation — including ripping, semi-finishing and finishing. For details, write NORTON COMPANY, General Offices, Worcester 6, Massachusetts.

*Trade Mark Reg. U. S. Pat. Office and Foreign Countries.

NORTON
BORON CARBIDE

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors
BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

Reynolds Ink Introduces New Line of Color Coding Enamels

Packaged in the handy 16 oz. aerosol container, the new enamels by Reynolds—the aerosol ink specialists—are easy to apply, fast drying and permanent.

* * *

They are said to provide the simplest and most economical way to color code inventory stocks and work in process; for marking tools by departments, identifying piping, valves, electrical connections; directing inter-plant routing of materials, inspection marking, and all other color coding operations. Ideal for spotlighting moving parts or other safety hazards; marking fire and water valves and similar emergency equipment.

* * *

For more complete details write Reynolds Ink, Inc., 2075 East 65th Street, Cleveland 3, Ohio for a copy of Bulletin No. E-611.

Novel Method for Speed Variation Used in Europe

(*Continued from page 762*)

eration the wire is being held back

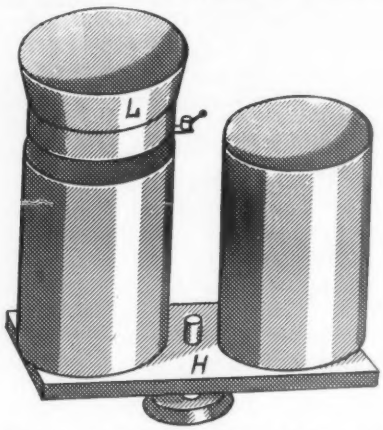


Fig. 3 — Revolving platform allows quick change of drums.

by drum "L", as shown.

* * *

These machines are designed either with a single receiving drum head or with multiple receiving drum heads assembled on the same frame. In the latter case, the receiving drums can be installed with an integral individual control, each one being operated by a "Sadivar" geared motor variator or equipped with semi-individual control. If the latter, one geared motor variator operates a certain number of receiving drums, each one able to be declutched from the common motor shaft.

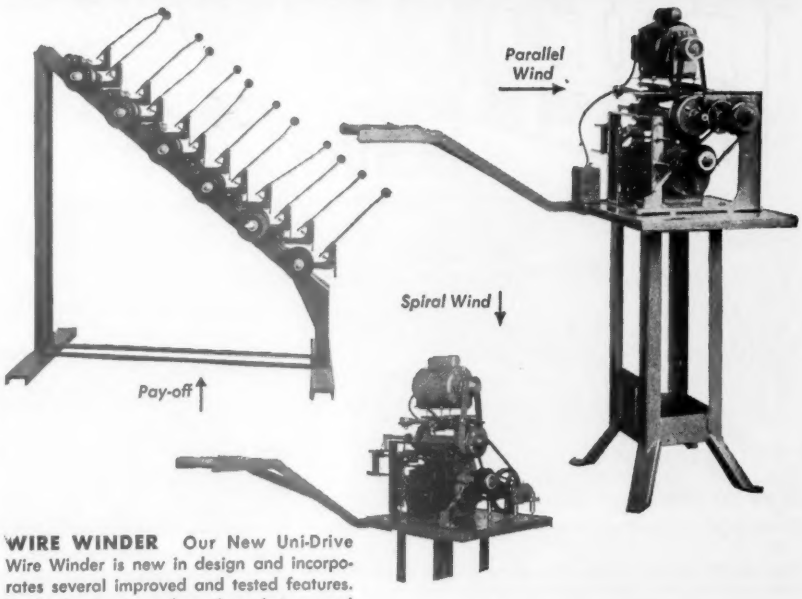
* * *

The Godderidge works also build receiving units for iron and steel wire in coils and can, in certain cases, equip these with electronic control. What is more, the same firm, working in collaboration with Dropsy, the cardboard manufacturers of Reims, has perfected a collapsible cardboard drum of small dimensions. This, owing to its extremely low cost, allows delivery to customers in non-returnable packages. Here again "Sadivar" speed variators have been chosen by the builders because of their notable adaptability and the possibility of covering all the required speed ranges from the lowest (from 4 to 250 rpm for enamelled —tinned or annealed wires) to the highest (up to 2,500 rpm. for drawn wires) by combination of the unit with SADI speed reducers. Sadivar speed reducers produce a positive drive and reliable operation.

"Sadivar" Motorized Speed Reducers

Throughout the wire and wire product industry the requirements for very accurate variable speed machines is great. To adapt machine speed correctly to fluctuating necessities is often the secret of plant efficiency and economy. A "Sadivar Type 53" speed variator, often combined with a "Sadi" speed reducer provides the above highly desirable feature for wire machinery. Marketed in the U.S. by ACEC Electric Corporation of New York, and designed and made by the worldwide known firm of Sadi, Brussels, Belgium, the principle of design is unique, but simple. A brief description should be of interest to the production engineer who looks out for an extremely accurate variable speed drive unit (See Fig. 4).

STANDARD UNI-DRIVE WIRE WINDER



WIRE WINDER Our New Uni-Drive Wire Winder is new in design and incorporates several improved and tested features. Production is stepped up through increased speed. It produces smooth, even and accurately wound spools of wire in single or multiple ends. All strands parallel — no over or under-winding. Can also be furnished with a slight spiral pattern for winding exceedingly fine wire. Automatic Stop Motion controls each strand. Traverse adjustable from 1¾" to 5½" between spool heads without changing cam. Designed especially for winding wire to be braided and shielded for electrical conductors.

Various types of supply packages that may be wound on Standard Uni-Drive Wire Winder.

PAY-OFF Our Pay-off Attachment consists of a heavy fabricated frame on which Pay-off spools are mounted to cover desired number of ends to be wound. Equipped with spindles, running on self-aligning ball bearings, with size of spindles and adapters to accommodate customers' pay-off spool. Compensating Attachment to control the tension of each individual strand of wire, applying the same tension when spool is full as when empty. Can also be adapted for use with bunching machines.

STANDARD MILL SUPPLY COMPANY
31 ESTEN AVENUE PAWTUCKET, R. I., U. S. A.

Fig. 4 — Sadivar Type 53 Variable Speed Gear Motor operates at 1500 rpm. Photo courtesy of ACEC Electric Corp., New York, N. Y. * *

Several thousand Sadivar "53" variators are in use throughout the world: the unit is of the friction type, all components being metallic. Transmissible Horse Power is identical at all speeds. The maximum ratio between extremes is 7 to 1. The unit may be run in both directions and is supplied for either horizontal or vertical operation and, if necessary, adapted to operate in another position than that for which it was originally intended. Motion is transmitted from the constant speed input end to the variable speed output end through a set of swivelling rollers. Static balance and reduced overall dimensions result from the number of rollers: three. The rollers are free to slide on their respective pins which are linked together by means of a self-centering knuckle joint. Consequently, the transmitted load is always equally divided between each of the three rollers whose swivelling motion is obtained by operating on one of them only. The pressure required for idle running is provided by an adjustable system fitted on the input end. On the output end, a grooved thrust race generates pressure proportional to the resisting torque. The oil pump fitted in the main casting is operated by a swash-plate fitted on the input thrust bearing and feeds lubricant to all working parts of the unit.

* * *

In order to simplify comments, the diagram shows two rollers only whose axis are situated in the same plane (instead of three rollers as used in the actual design (Fig. 5).

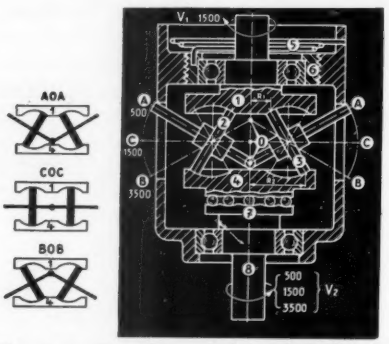


Fig. 5 — Operating principle of Sadivar-53 Speed change. * * * * * * * *

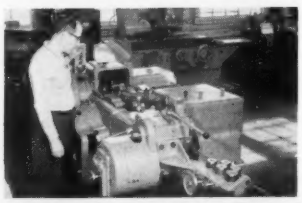
The parts shown in the diagram work as follows: 1 — Driving disc at constant speed; 2-3 — Intermediary rollers; 4 — Driven disc at variable speed. Variation is produced: If V_1 is the constant speed of disc 1 and V_2 the speed of disc 4, the variable $V_2 = V_1 \times \frac{R_1}{R_2}$. Therefore when rollers are in extreme position AOA, $\frac{R_1}{R_2}$ is minimum and V_2 is also minimum. When rollers are in extreme position BOB $\frac{R_1}{R_2}$ is maximum and V_2 is maximum. However, when rollers are in half way position COC $R_1 = R_2$ and $V_1 = V_2$. An infinite number of

For THE ABBOTT BALL COMPANY... THESE GREENBAT HEADERS

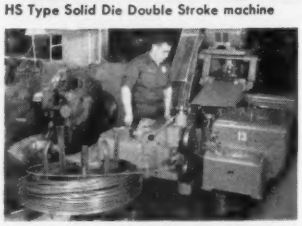
HS Type Solid Die Single Stroke machines

...HAVE INCREASED PRODUCTION 200%

...AND REDUCED MAINTENANCE BY 50%



HS Type Solid Die Double Stroke machine



No. 3 (⅜") Solid Die Single Stroke machine

The world's leading producer of carbon steel bearing balls and shapes, Abbott has moved positively to ensure this leadership by installing versatile, high speed Greenbat heading machinery. In addition to the outstanding advantages cited above, Abbott has broadened its manufacturing capability considerably.

Available through the "Greenbat Sales Division" of Unitech Products, Inc., the famous Greenwood & Batley Ltd. line includes single, double, and triple stroke machines, head trimmers, friction presses, and thread rollers. Every machine is completely motorized and has a wire straightening feature as standard equipment. Other features include durability and speed comparable to any standard domestic machine, ease of tool setting and complete tool interchangeability with machines of other makes. They are supplied with American threads if desired.

You too can take advantage of Greenbat's low investment requirement, economy of operation, and outstanding performance efficiency. Investigate now by writing for complete data on your specific needs.

GREENBAT SALES DIVISION

UNITECH Products, Inc.

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positions and speeds are obtainable between positions AOA and BOB. 7 is a mechanism providing pressure required for idle running.

* * *

Grooved thrust race linking disc 4 to output shaft 8 and generating between discs and rollers an additional pressure proportional to resisting torque on shaft 8. A combination of Sadivar Type 53 variable speed motor unit with a Sadi speed reducing gear is available in 24 standard speed ranges from 258/1807 r.p.m. to 0.087/0.615 r.p.m. This extraordinary wide speed range will certainly meet all requirements from wire manufacturing firms.

* * *

Acknowledgement is due for data and illustrations to the firms mentioned, and also to **Mr. G. W. Shepherd** of Sadi Engineering Co. Ltd. of London, England.

A Million Severely, Multi-Formed Parts Without Rejects Result from Wire with Consistent Tensile

(*Continued from page 763*)

Each of the four flat bearing surfaces has to be punched and tapped. Again the wire has to have predictable tensile strength to produce proper thread pitch and assure good tap life and performance. The holes, after the hinges are formed, have to line up exactly to fit screws on the male section of the appliance door.

* * *

Physical properties of the stainless wire have been so consistent that the company virtually has been able to eliminate rejects, increase production, and vastly reduce the amount of time required to check the material through both production and final inspection. While the company previously had to inspect constantly, all down the line, it now needs to spot check only, because tolerances have been nearly twice as close as those required.

Welded Wire Mesh Plant Bought

American Pipe & Construction Co., Monterey Park, Calif., has purchased **Planett Mfg. Co.**, Downey, Calif. Planett has been a leading manufacturer of electrically welded steel wire mesh used by Pacific Coast construction firms for reinforcing concrete.

* * *

Under the new set-up, Planett Mfg. Co. becomes a division of **Etiwanda Steel Producers, Inc.**, a source of reinforcing rod and wholly owned subsidiary of American Pipe & Construction Co. **Earl Planett**, former president, remains in charge of welded wire mesh production.

Translations Available

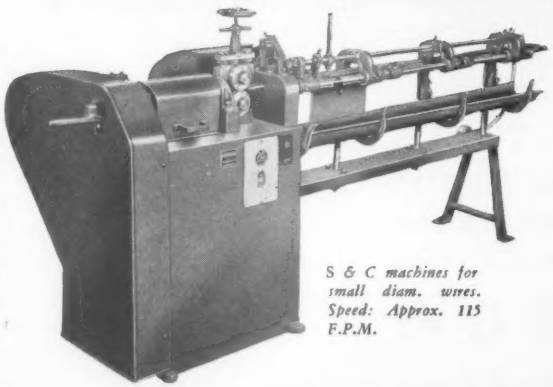
The British Iron & Steel Industry Translation Service of The Iron & Steel Institute, 4 Grosvenor Gardens, London, S.W. 1, England, has announced the availability of additional foreign language translations, among which are the following that are of interest to our industry:

1947 Comparison between pickling of

New! Improved! Fast!

WELLS

STRAIGHTENER & CUTTER



S & C machines for small diam. wires. Speed: Approx. 115 F.P.M.

This completely redesigned line combines maximum efficiency with that rugged dependability, for which WELLS S & C machines have become justly famous.

Built in several sizes to handle 2 to 18 ga. basic and high carbon wire.

FEATURES

The guide bar of these new machines can be supplied for any cut lengths • The rotary flier runs on ball bearings for smoothness and long life • Cut-off is actuated by a solenoid for extreme accuracy of cut lengths • A two point cam construction provides a quick and positive return of the cut-off knife, eliminating the need for a clutch and dog • A counter is standard equipment.

A COMPLETE RANGE OF S & C MACHINES IS MADE BY WELLS FOR ALL SIZES OF WIRE. SEND FOR CATALOG ON THE COMPLETE LINE.

Frank L. Wells Company

BUILDERS OF FINE WIREWORKING MACHINERY

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OR — HARVEY SPRING MFG. CO. — 671 N. Sangamon St., Chicago, Ill.

steel in phosphoric acid solutions, and pickling in sulphuric acid and hydrochloric acid solutions.

G. von der Dunk (£2 10*s.* 0*d.*)
Stahl Eisen, 1960, 80, Sept. 29, 1318-1321.

Resistance to corrosion of steel surfaces pickled with phosphoric acid. Deformability of the protective film formed. Pickling rate and scale decomposition. Reclamation of spent pickling solutions. (Author's summary).

1677 Scaling rod of wire
P. Funke, jun., *and* W. Lueg (£6)
Stahl Eisen, 79, 1959, Oct. 29, 1581-1590.

Studies on a number of rolling mills which operate under different conditions showed that the removal of the scale formed during rolling depends much on its structure. It is concluded that modern mills with high rod-speeds usually deliver the rod at higher temp. than did the older models, thus rendering the scale thicker. The effect of cooling not only affects the thickness of the scale but also its structure. Rapid cooling suppresses wustite transformation, which means that the portion of magnetite that can be removed with difficulty remains low. Large coil weights are to be avoided as owing to the lower cooling rates scale formation is heavy and the wustite transformation is also not suppressed. (*J.I.S.I.* abstract).

1832 Developments in wire rope fatigue testing
U. Rossetti (1£ 15*s.* 0*d.*)
Transporti Industriali, 1959, 5, July-Aug., 1126-1128

A schedule of testing methods is developed and typical results are given and discussed. Scatter is considerable but is not beyond the inherent variations of fatigue strength. (Abstract preprinted from *J.I.S.I.*).

* * *

These may be ordered from the above Service. Prices follow each item.

New Teflon Forms

"Teflon" FEP fluorocarbon resin, commercially available since February, 1960, can now be purchased as a dispersion or as formulated spray finishes according to the **Du Pont Company.**

* * *

The dispersion, called "Teflon" TE-9500 FEP, is expected to find wide acceptance as a class H impregnant and surface coating for wire and cable, component insulation, and in electrical and chemical applications.

* * *

Surface coatings of FEP dispersion, or impregnated fabrics or yarns containing FEP dispersion, can be sealed together, or to wire insulation, films, or massive shapes made from FEP or TFE fluorocarbon resins.

* * *

"Teflon" FEP fluorocarbon resin spray finishes, which offer improved corrosion protection in surface coatings, are also now available on a trial marketing basis from the Fabrics and Finishes Department of Du Pont. These finishes are codes 851-454 enamel green and 852-401 clear.

* * *

Adherent, low permeability coatings of the "Teflon" FEP finishes may be fused at temperatures of 575 to 625 degrees Fahrenheit, a distinct advantage over the older TFE spray finishes when coating certain relatively soft aluminum and copper alloys.

Your answer for producing bunched wire with the smooth concentric qualities of stranded wire . . .

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BUNCHER-STRANDER

makes every foot of wire perfectly uniform

For concentric wires with layers made up of wires in opposite lay directions, or for semi-concentric wire with layers in same direction but with different lays . . . a Cook Buncher-Strander delivers uniform wire at high speed. The secret is the single twist flyer and the Cook patented method of providing differential speeds between flyer and reel. Why delay? Get the complete details today by writing for illustrated brochure.

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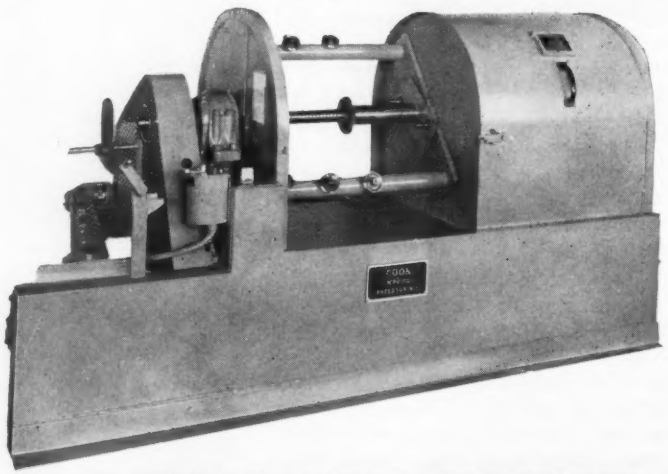

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New Installation for Preparation of Steel Blanks for Cold Forging

(*Continued from page 759*)

fixed stop of the cropping tool, thus applying a continuous but flexible pull, which ensures accurate feeding.

* * *

In the installation shown in Fig. 1, the cropped blank is gripped by a transfer conveyor which moves the blank to the next machine of the installation. This conveyor system consists of two positively driven chains provided with carrier dogs, arranged to face each other. The relative spacing of the chains can be varied simply by adjusting the rails on which they run, thus providing the necessary adaptability to handle blanks of different size. The carrier dogs of each chain are always positioned opposite each other so that the space between the carrier dogs forms a positive pocket from which the blank cannot escape and in which it is moved at the correct operating rhythm to the next processing stage, in this case the pre-forming machine. The conveyor carrying the cropped steel blanks passes through the preforming tool and then carries the preform to the chamfering machine, where it is dropped into a chute. The conveyor then returns to the cropping machine, passing underneath the preformer in its passage.

* * *

The pre-forming machine consists of a frame with an overhead platen mounted on four columns. The blanks enter the machine and are flattened by the upward movement of a ram to a fixed stop. The ram is hydraulically driven from a self-contained hydraulic unit which is coupled to the machine and located next to it. The hydraulic unit consists of the reservoir with hydraulic pump and valves as well as the pre-filling cylinder and the necessary controls and monitoring instruments.

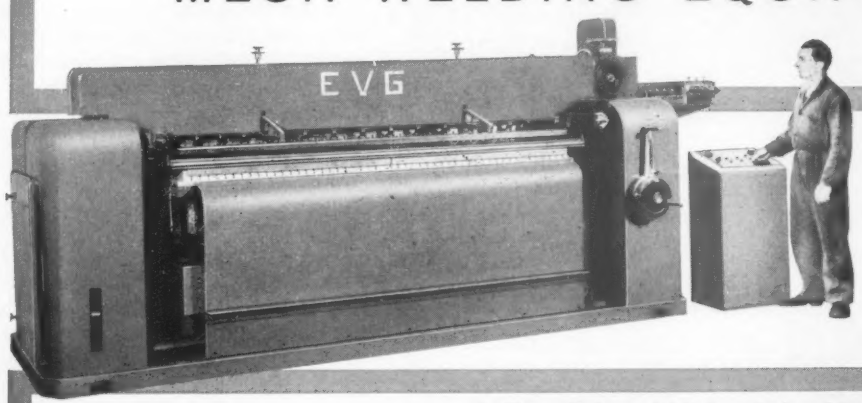
* * *

The operating cycle of the preforming machine is linked to that of the cropping machine, in this case by an electro-magnetic clutch, driven by the feed chain on the discharge side of the cropping machine. This clutch actuates the solenoid valves which in turn control the operation of the preforming machine. The clutch control unit is also a standard item which can be fitted to other machines of the series. The pre-forming machine can be fitted with a simple flattening tool or it may be fitted with different tools which will impart an initial shape to the blank to facilitate easier development of the final form of the forging by subseqent cold forms.

* * *

After completion of the flattening operation, the blanks are transferred by the same conveyor to the deburring machine which is designed to remove the inevitable cropping burr from the blanks. The blanks enter the actual working zone of the machine on a panfeeder, after which the blanks are advanced to the chamfering tool by spring-loaded roller fingers,

COMPLETE LINE OF FULLY AUTOMATIC MESH WELDING EQUIPMENT



EVG designs and builds the world's most complete line of wire fabric welding machinery—five complete plants covering the entire field of welded mesh. Wire sizes from 7/0 to 25 gauge; all conventional spacings, down to 4 mesh (¼" x ¼"). Special plants can be engineered to customer's specifications.

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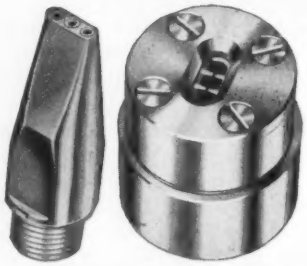

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CENTRAL STEEL DIES are made in Round, Figure 8, Serrated, Tracer, and other special shapes to your specifications.

A newly designed Tru-Rip Die Assembly can be taken apart, cleaned, blades changed, and the whole reassembled easily and quickly. Made for 2 and 3 conductor wires to be coated in extrusion machines.

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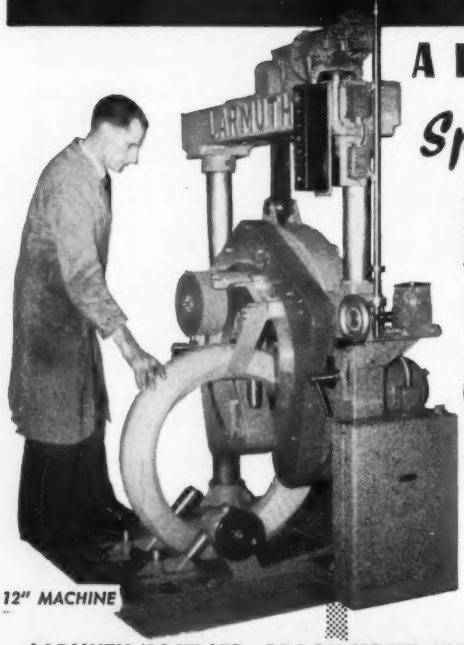

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which press the blank against the tool, so that the movement of the blank along the tool takes the form of a hobbing action. The actual chamfering tool takes the form of a bevelled inverted milling cutter, whose operating depth can be varied by a simple handwheel adjustment. This method of operation ensures that a uniform amount of chamfer is applied to blanks having a somewhat irregular periphery, as would be expected from raw material consisting of rough-rolled barstock. The machine is independently driven by its own electric motor and includes provision for continuous separation of swarf from the coolant.

* * *

Both the coolant tank and the coolant pump are an integral part of the machine. The blanks are in contact with the deburring tool for approximately one half of the circumference, the depth of engagement varying between minimum and maximum over this distance. The completed blanks are automatically ejected from the machine through a chute, and are ready for heat-treatment and for surface-treatment, before the cold forging operation.

* * *

There must be a break in the automatic flow of material after chamfering, because at this stage the components are usually removed from the production line for the surface-treatment in a phosphate bath or for intermediate heat treatment.

* * *

The entire installation is controlled from a cabinet which can be seen in the background of Fig. 1. Each machine is provided with safety devices which immediately stop all linked units of the system in the event of broken tools, defective blanks or feeding faults, etc.

* * *

The installation and its individual units, which can of course all be used separately in a variety of different combinations, are very flexible and versatile. This is an important requirement of modern production techniques, in order that extension and modification of plant to suit different require-

ments is fully met. Therefore, the units of this installation need never be idle as a result of a change in the production programme, while further extension of the production programme or a greatly increased output requirement can be easily met by a recombination of the units with transfer mechanism and other items which are already standardized.

New Packages for Brazing Wire

The Westing-Arc Department of **Westinghouse Electric Corporation** announces that phosphorous-copper and phosphorous-silver brazing alloys, B CuP-2 through B CuP-5, are now available on disposable spools.

* * *

The new package permits savings in time and material by making it unnecessary to scrap or weld short rod ends together. By mounting the spool above, below, or beside an operator, it is possible to pull off the proper amount of wire readily as needed in the joint. The plainly marked package eliminates identification problems in plants where two or more different alloys are used. Protection against oxidation and contaminants during shipment and storage is provided by vacuum-sealing the spools in polyethylene containers.

* * *

Primarily designed for oxy-acetylene brazing, the new package is available in 25-pound spools of .035 through 3/32-inch wire diameters, and in 1½-pound spools of .035 and .047-inch wire diameters. The alloys continue to be available, in addition to the spools, in coil, rod, powder, and ring form.

Miniature Aluminum Rivets

Tiny aluminum rivets — only as long as the thickness of a half-dollar — are being produced today by **Aluminum Company of America.**

* * *

Among the smallest fasteners ever made of the light metal at a

PEAK PERFORMANCE with
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Over thirty years of successful experience with leading wire manufacturers provide the greatest assurance of better production with PERMAG wire drawing compounds.

Formulated in the Magnuson laboratories for guaranteed peak performance, PERMAG compounds consistently prove themselves ideal for all types of wire drawing, for both production and economy.

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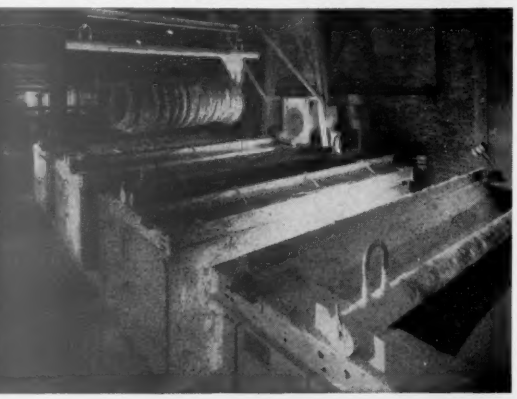

Faster baking, greater fuel economy, maximum production efficiency are just a few of the results of the exclusive heating arrangement of the Carl Mayer Hi-Speed Rod Baker. It also has a patented blow-off feature which removes moisture without damage to coils.

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Wire is easily "loaded" into measuring machine from the side or the rear without having to feed through guide bushings. Brake stops measuring wheel instantly when wire leaves measuring rolls. Predetermined units will automatically stop wire at desired length. Very accurate speeds to 2500 ft. per minute.

MODEL "L 25"
Capacity .030 to 1 in. Tachometer to govern rate of speed is optional.

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DURANT
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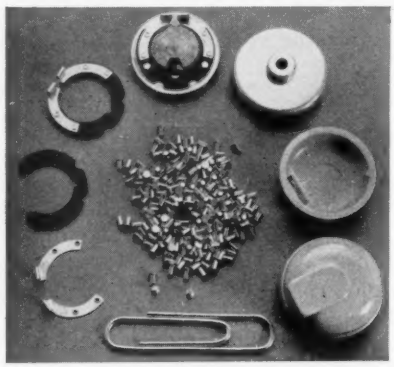
mere 5/64 of an inch long, the rivets are used by Dyna Magnetic Devices, Inc., to assemble components for hearing aids, stenographic dictating equipment, and transistor radio receivers.

* * *

These fasteners are produced at Alcoa's Lancaster (Pa.) works from 0.042-inch diameter wire. One cold-heading machine upsets the wire into rivets at a machine-gun-like rate, yielding over 90,000 pieces from one pound of the fine wire strand.

* * *

The rivets are shown above grouped in the center of a ring of components from one of the Dyna Magnetic hearing devices.



Assembly steps are demonstrated by following the parts clockwise from the left of the standard No. 1 size paper clip. The first two small pieces to the left of the paper clip, used as conductors, and the half of the shell with the hole in the top are aluminum screw machine products made by Alcoa. Advantages of aluminum for these items are its light weight, good electrical conductivity, and low unit cost compared to competitive materials.

Wire Firm Appoints Representative on West Coast

James L. Lee, President of **Thermatics, Inc.,** Elm City, N. C., pioneer manufacturers of Teflon insulated wire, has announced the appointment of the **Bucky Harris Company** as West Coast representative for their line of Teflon and Vinyl insulated wire and cable.

* * *

The company's products, accord-

ing to Mr. Lee, are widely used in the Southern California, as well as the national market, as components in the space and missile programs. Thermatics is well-known for manufacture of a highly reliable product and several development breakthroughs. The surface treatment of their Teflon wire, "Color-Tru", which in no way affects the color coding of the insulation, enabling their use with an epoxy resin to yield high strength and pull-out characteristics, is one of their well-known developments.

* * *

Another significant development is their "Thermo-Sealed" method of inlaying colored stripes spirally embedded in the dielectric rather than surface applied. The permanence and indestructibility of this process has received the approval of engineers and designers in the missile and space field.

* * *

The company also produces miniature Teflon insulated hookup wire, ideal for applications where space and weight are important criteria. This wire has an extruded Teflon insulation of five mils and and 300 volt rating. This miniature wire is available with the "Thermo-Sealed" stripe and the "Color-Tru" surface treatment.

"Special Coatings"

A four-page folder describes 18 special industrial coatings for all types of metal-using industries, designed for one or more of the following uses: (1) product protection, (2) improvement of appearance, (3) mold or die release, (4) dry lubrication. Problem-solving coatings described fall in four general chemical categories—wax emulsions, resin emulsions, solvent-base waxes and self-polishing solvent base waxes and resins. Description includes data on methods of application, coverage, drying time and characteristic uses on aluminum, brass, copper, cast iron, magnesium, steel, chrome and on surfaces of other materials. Available from Service Products Division, **S. C. Johnson & Son, Inc.**, Racine, Wis.

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Continuous Tension Control
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It is equipped with shaftless, fast loading cradles, with means for locking reels in place and eliminating side slap.

Operating speeds from 70 to 105 R.P.M. Power can be supplied either by an induction motor, Warner clutch, and Vee belt drive, or a wound rotor motor, resistors, and Vee belt drive.

This Machine accommodates reels 10 Inches Diameter, 10 Inches Overall Width.

Filling Head for 18 packages, 8 inches diameter—8 inches traverse, equipped with adjustable friction devices.

Binding Head accommodates six yarn packages 6 inches diameter, 4 inch traverse and is driven through a clutch, counter shaft and variable speed device.

The Eccentric Taping Head accommodates 4 pads 18 inches in diameter, 2 inches in width, and is driven through a clutch, counter shaft, and variable speed device. Tape pads equipped with constant tension devices.

Capstans are dual 4 groove 30 inches diameter, driven through change gears.

This Planetary Cabling Machine is one of a number which we have built handling reels 8, 10, 12, 16, 19, 24, or 30 inches in diameter. We can supply Standard units to meet practically all requirements.

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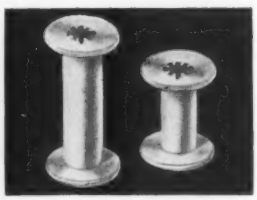

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Regional Meeting of the Electric Wire and Cable Section of The Wire Association

(*Continued from page 757*)

Following this the meeting was adjourned.

The Plant Inspection Trip

The first day was devoted to a visit to the Bell Telephone Laboratories in Murray Hill, N. J. Busses left the hotel at 10:30 A.M. on Thursday, April 27, taking 200 persons direct to the Suburban Hotel in Summit, N. J., where they were provided with a fine luncheon as the guests of the Laboratories.

* * *

Following the luncheon, the gathering was welcomed by **President Worth. J. K. Gillett,** General Program Chairman, then added his voice of satisfaction at the fine turnout, introducing the Committee members and the speakers to the gathering.

* * *

Busses transported the group to the Laboratories, where they were divided into small groups and shown through the mammoth buildings to points considered to be of particular interest to wire men. These points, among others, included the Arnold Auditorium, designed for perfect acoustical properties, where brief addresses of welcome were made by **R. P. Jutson** and **K. G. Van Wynen.** Points visited included the "Dead" Room, where sound is caused to "decay"; the Metallurgical Laboratory, the Mechanical Testing and Microphotography Laboratory, the Bioassay Laboratory, the Concourse, the Cable Joining Laboratory, the Switch Board Wire & Cable Laboratory and the Computer Department. Following these tours the group reassembled in the Arnold Auditorium, where short talks were heard by **Clement C. Lawson, R. P. Jutson,** Visitor Programs, **K. G. Van Wynen,** Director of Public Relations, and **R. J. Nossaman,** Director of Design Engineering.

* * *

Busses returned Bell's visitors to the hotel toward the end of the afternoon, after a highly re-

warding, interesting and unusual "plant" inspection tour, for which we all are indebted to the Laboratories' management for their many courtesies.

The Hospitality Hour

Some 225 persons attended this convivial and friendly function which the ladies accompanying the men to the meeting were invited to attend. The Ballroom was opened at 6:00 P.M. and most remained until well after 7:30 o'clock. The function was very satisfactory from all standpoints. This year, instead of having the "Hour" sponsored by a group of suppliers, tickets were sold to the affair, which was considered to have worked out very well, indeed.

The Technical Sessions

The morning and afternoon of April 28, were devoted wholly to the series of nine technical papers as scheduled in the program published on page 434 of the April issue of **Wire and Wire Products. Richard Bliss,** Vice President of Mohawk Development Service, Inc., Schenectady, N. Y., served as Moderator of the morning session, and **J. E. Thomas,** Manufacturing Superintendent of the Phillips Electrical Company Ltd., Brookville, Ontario, Canada, acted as Moderator of the afternoon session. Lively discussions, bringing out much information of value, followed each paper.

The Ladies Program

The wives who came with their men-folk had a program arranged by **Robert R. Hanna,** Manager of Wire & Cable Sales, Owens-Corning Fiberglas Corporation. They gathered at 10:00 A.M. for a get-acquainted coffee hour in the Windsor Room, then were taken to the new Union Carbide Building, shown through it and treated to an excellent luncheon as the guests of the Union Carbide Plastics Company. The entire afternoon was spent on a visit to the United Nations, where, among other things, they were able to observe a session that was in progress and hear the various foreign speakers' talks

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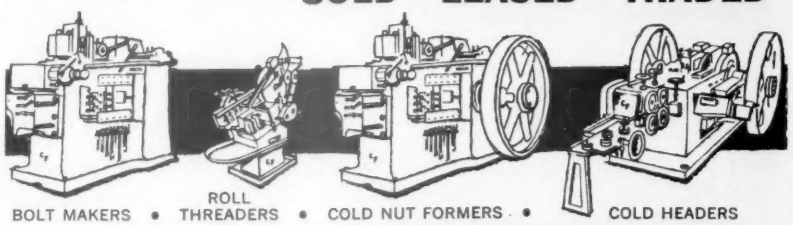

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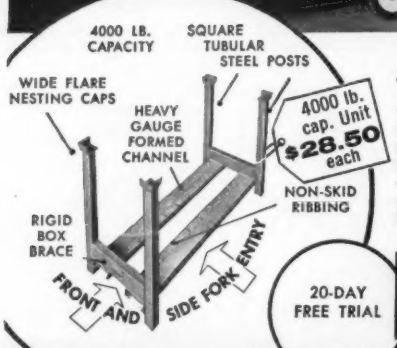

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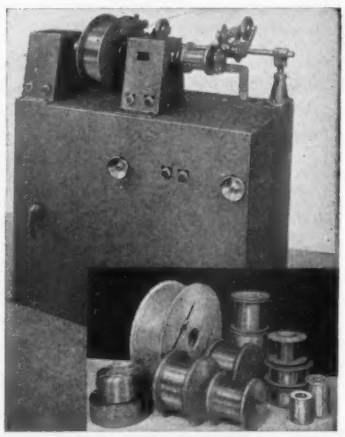
You are invited to consult us on your wire spooling problems. Our engineering resources and years of experience are at your service. Emory Winding Machines have been the standard of the industry. Most every major plant has Emory equipment.



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translated into English. The fourteen ladies taking advantage of this program reported most enthusiastically upon their interesting and enjoyable day.

The Program Committee

Responsible for the excellent 1961 program were the following gentlemen:

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Industrial Equipment Co.
Englewood, N. J.

LOCAL ARRANGEMENTS
George L. Morris, Vice Pres.
Syncro Machine Co.
Perth Amboy, N. J.

PAPERS
W. R. Moyers, Chief
Wire Engineering Dept.
Western Electric Co.
Buffalo, N. Y.

HOSPITALITY HOUR
Harry N. Bockus, Sales Mgr.
Solar Compounds Co.
Linden, N. J.

PLANT TRIP
Michael M. Suba, Mgr.
Extrusion Markets
Union Carbide Plastics Co.
Div. of Union Carbide Corp.
New York, N. Y.

PAPERS REVIEW
James S. Higgins, Plant Eng.
Copper Division
Walker Brothers
Conshohocken, Pa.

As a business is said to be the lengthened shadow of a man, so a meeting of this type reflects the caliber of the Program Committee arranging it. The two-day meeting testified to the quality of thinking of this Committee. Their preliminary planning and labors resulted in a program that lived up to the expectations of the officers, directors and members of the Association. All of us salute and thank them for the work that made this meeting so satisfactory in all respects.

Attendance Lists Available

A List of those who attended the Regional Meeting of the Electric Wire & Cable Section of the Wire Association in April is available at a cost of $3.00 per copy. Please send orders to:

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Establishing A Tape Standardization Program

(*Continued from page* 755)

due to smaller pad capacity. However, calculations indicated that the increased labor cost amounted to less than one mil per pound which was much less than the carrying charges on the stock which would have to be carried if two large pad sizes or two small pad sizes were maintained.

* * *

In addition our studies revealed that we had been purchasing a pad size with an outside diameter of 15″ whereas we found that we could actually use an 18″ pad. Naturally, we standardized on the 18″ pad size and in effect actually increased the pad volume in spite of increasing the inside diameter from 4 to 5½ inches.

D. Set Up Master Tape Charts

The purpose of these charts is to show which tapes are required for the product lines being manufactured for inventory stocking purposes. In addition, we found that certain slow moving inventory items could be eliminated by using other widths and/or other tapes. The use of master charts greatly facilitates changes of this type. See Sample Table III attached.

E. Set Up Definite Procedures to Follow When Changing to New Type or Packages of Materials

When a new raw material is added to the inventory as an additional item or as a replacement item, there must be some orderly means of advising the various people in the organization of the specifications and applications for the new material. In addition, there must be some controls to prevent unwarranted changes in product design or inventory levels, and in the case of replacement items the disposition of the replaced items must be spelled out.

* * *

The form, "Authorization For Stocking New Raw Material," was designed to accomplish these ends. Since adoption of this form we have been able to exercise a much greater degree of control over raw material changes.

* * *

When new materials are approved as replacement items for items presently in the inventory, or when product design changes eliminate the use of certain items (e.g. tape widths) we found it to be good practice to attach flags to the inventory cards for the replaced items advising that they are not to be reordered. In cases where present replaced items are still usable for their intended application, they are used up before the replacement items are ordered. If present replaced items are no longer satisfactory for their intended application or any other foreseeable application, they are sold or scrapped.

* * *

On the other hand, if they are no longer satisfactory for their intended application but can be used on other applications without compromising quality, we make an all out effort to use them up rather than resort to scrapping or selling

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the material for distress prices. We found that using this replaced material was best accomplished by first determining the acceptable applications for the materials, and then taking steps to scan each order for the specific purpose of using up these materials. If substitution can be made, the "deviation" is indicated on the manufacturing instructions going to the shop.

* * *

Summarizing we found that by taking the necessary steps to select the least expensive types of tapes and methods of application, and to minimize the number of widths and pad sizes required, we reduced our product and inventory costs, improved product quality, and improved our general operating efficiency.

Awards For 1960 Papers Announced by The Wire Association

(*Continued from page 772*)

CLEMENT C. LAWSON, Plant Facilities Eng.
Bell Telephone Laboratories, Inc.
Murray Hill, New Jersey

* * *

All Association members are cordially invited to submit papers or articles. Each such editorial contribution will be carefully judged on its merits for an award.

Attendance Lists Available

A List of those who attended the Regional Meeting of the Electric Wire & Cable Section of the Wire Association in April is available at a cost of $3.00 per copy. Please send orders to:

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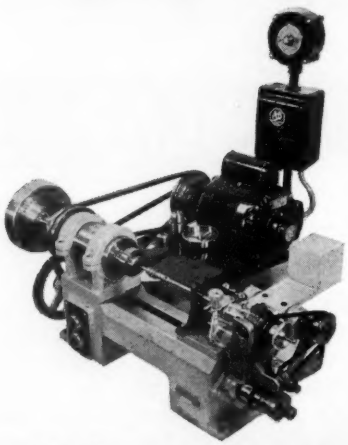

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Modern Enameling and Packaging Procedures

(*Continued from page* 743)

tem, and a couple even went so far as to install a system in their operation, for some reason or other, satisfactory results could not be attained. As far as I know, only one magnet wire producer in America today is successfully applying enamel by means of the dieless method. During the past couple of years a tremendous amount of research has been put into the development of die-less application by my company, and we have refined this process to a point where we are confident that it can be offered to the industry. For those of you who see our pilot machine in operation, you will have the opportunity of seeing enamel applied by means of the dieless method. We believe that we have come up with a system which has the capabilities of producing a uniform, concentric film of enamel. It does not take too much imagination to realize the benefits that this system holds for the producer of wire. The savings in purchasing new dies and servicing and maintaining dies in use alone could account for a sizeable sum of money, not taking into consideration the improvement of quality of finished product produced by this method. The use of this system does not require any special skills and can be introduced into any operation with a minimum amount of training on the part of the operator.

* * *

In considering a modern enameling facility, it is a must to consider a pre-annealer as part of the complete system. Like the oven, the annealer should be built as a high convection system.

* * *

The annealer can be furnished either gas fired or electrically heated. Some quarters prefer the gas fired unit in preference to the electrically heated unit because with some designs the products of the gas itself becomes part of the atmosphere system. A simpler yet practical pre-annealer can be had by using an electrically heated unit with water seals at the output and input ends. A unit of this type will generate its own inert atmosphere, with the wire supplying the neces-

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sary water vapor to facilitate a bright anneal without the introduction of inert gases.

* * *

I believe I have covered a complete system which in my belief is adequate to meet the present as well as future demands. There is only one point which I did not touch on that perhaps should be brought into this discussion, and that is the matter of guide sheaves. Cast sheaves have been used by the wire industry for ages. The problem with the cast sheave is that the average aluminum casting is somewhat porous, whether it be a sand or a die casting. Porosity in a sheave casting will account for a pitted surface when the casting is machined. Pitted sheaves on an enameling system may cause untold difficulties. There have been some developments in recent years with various casting alloys whereby sheaves can be cast and by using the correct alloys these castings can be turned to an ultra-smooth absolutely pit-free finish. For larger diameter sheaves, there is as of now no substitute for the cast sheave. However, on smaller diameters, 14 to 15 inches and smaller, a process has been developed whereby a sheave can be rolled out of flat aluminum sheet material. The rolled type sheave is far superior to any cast sheave ever made in that the guide groove is actually a burnished surface finish absolutely free from any pits, grooves, or toolmarks. The fact that these sheaves are made of aluminum enables them to be anodized, which provides for a hard smooth surface. The rolled sheave is light in weight, stable, rigid and warp-free. They can be furnished as interlocking or plain type.

* * *

In this paper I have covered only the highlights of some of the many theories that have come out of the vast research program which my company has been conducting. We are limited for time, so consequently it has been impossible to include much theory. I have tried to incorporate into this paper our thinking of what we feel is the ultimate in modern design and thinking when it comes to enameling machines to meet the demands of

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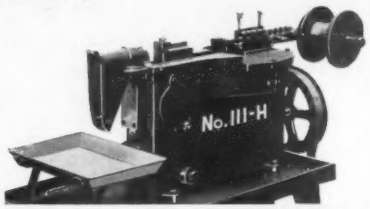

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the present and the packaging demands of the future. Undoubtedly there are several here who disagree with our thinking, and as the fellow says, we could be wrong. I want to thank you all for your interest, and again let me extend to you an invitation to come to our plant at Minneapolis and see a machine, such as I explained here today, in actual operation.

U. S. Representation in Canada

H. M. Coleberry & Associates, 403 Broad St. East, Dunnville, Ont., Canada, Canadian importer and distributor, offers a bulletin on the firm's services to U.S.A. manufacturers desiring to sell products in Canada. H. M. Coleberry, head of the organization, states that his company can save manufacturers many of the worries resulting from out-of-country shipments by providing services adjusted to the individual requirements of the products to be sold. Inquiries on the Coleberry services are invited.

The Vacuum Hopper in the Extrusion of Electrical Insulation Using PVC Dry Blends

(*Continued from page 749*)

the hot dry blending operation. PVC 3250 is a variation of the Pearl resin type designed for even higher levels of plasticizers, particularly polymerics.

* * *

The capacity of resins to absorb high levels of plasticizers and yet produce blends having good flow properties can be demonstrated with polymeric plasticizers. Four resins were studied with 50, 70 and 100 parts of two polymeric plasticizers. These plasticizers are of the polyester type, one of molecular weight approximately 2200. The other, perhaps the most viscous and most permanent plasticizer available, has a molecular weight of 8,000. Measurements were made of the volume of blend retained on a circular

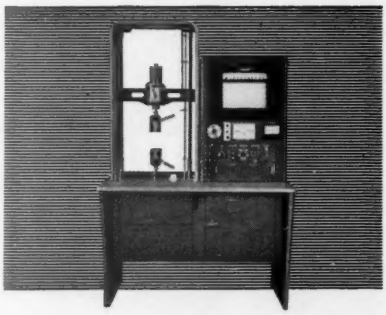

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plate as described in method 2. The results are shown in Table I. With the lower molecular weight plasticizer, PVC 1250-E produces dry blends having better flow properties than blends made with a typical dry blending resin. PVC 2250 and PVC 3250 show advantages at the 100 phr level. With the higher molecular weight plasticizer, the advantages of PVC 2250 and PVC 3250 are evident at all levels of plasticizer.

Summary

The vacuum hopper has been shown to be effective in eliminating porosity and rough surface in electrical insulation extruded from dry blend. Insulation having excellent electrical and physical properties has been produced at high extrusion rates with a 2½" extruder. While some manufacturers are successfully extruding from dry blend today, it is felt that as extruders of greater and greater speeds become available, the vacuum hopper will play an essential role in vinyl dry blend technology. This will create new requirements for PVC resins, particularly particle size and plasticizer absorption as related to the flow behavior contributed to the blend by these properties. Unique PVC resins are available today which exhibit these properties.

Acknowledgments

The authors wish to express appreciation to Messrs. **F. T. Birch, P. Browne, A. R. Donaghy Jr., J. P. DiOrio, T. Kelly** and **A. H. Stone** for their invaluable help in accumulating the information for this paper.

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Machinery Firm's Suit Settled

The Superior Court for Fairfield County, Connecticut, has issued a stipulation embodying a settlement of a suit by the Coulter and McKenzie Machine Company against Advanced Wyrepak Company, Joseph J. Kovaleski, Fabian W. Zawadski and Gordon L. Bauer, under which the defendants are barred from producing and selling for a period of seven months from April 19, 1961, wire packaging machinery employing the "S" principle of packaging wire into containers.

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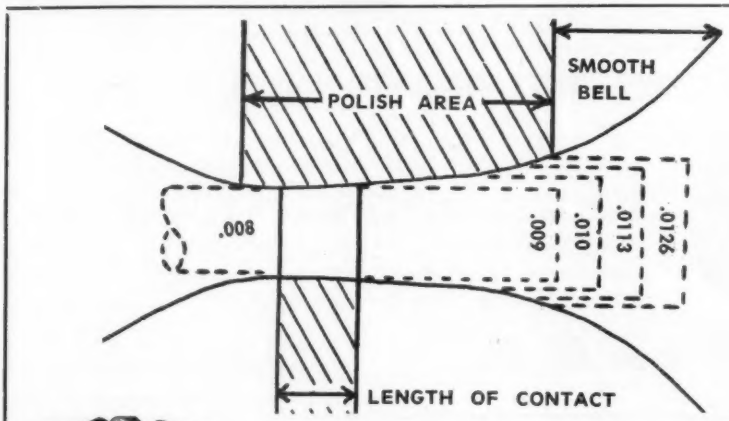

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* * *

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(See Inhibitors, Pickling)

ANNEALING MACHINES — Electric Resistance
Syncro Machine Co., Perth Amboy, N. J.
Walco Electric Co., Providence, R. I.

ANNEALING POTS AND BOXES—
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.

BAKERS—
(See OVENS—Rod Bakers)

BAR—Steel
Eaton Mfg. Co., Massillon, Ohio

BOBBINS—Braider & Wire Weaving
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Plastic Mold & Engineering Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.

BORAX—Wire Drawing
U. S. Borax, New York, N. Y.

BRAZERS—Electric for Wire
Steele Company, M. G., Rome, N. Y.

CABLE ACCESSORIES
Southwire Co., Carrollton, Ga.

CABLE—Electric
Laribee Wire Inc., Camden, N. Y.
Southwire Co., Carrollton, Ga.

CABLE FILLERS—Paper
Ludlow Corporation, Needham Heights, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

CAPSTANS—for Wire (also Caterpiller Types)
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Div. of Franklin Research and Development Corp., Mystic, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

CEMENTS—Refractory
Amchem Products, Inc., Ambler, Pa.

CLEANERS—Metal
Amchem Products, Ambler, Pa.
Apex Alkali Products Co., Phila., Pa.
Circle Chemical Co., Chicago, Ill.
Magnuson Products Corporation, Brooklyn, N. Y.
Miller, R. H., Co., Inc., Homer, N. Y.
Parkin Chemical Co., The, Pittsburgh, Pa.
Standard Industrial Compounds Co., Frankfort, Ill.

CLEANING & PICKLING EQUIP.—
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Morgan Construction Co., Worcester, Mass.
Wheelabrator Corporation, Mishawaka, Ind.
Wilson, Lee, Engr. Co., Cleveland, Ohio

CLOTH—WIRE, All Metals
Hudson Wire Co., Pequot Div., Norwalk, Conn.
Wickwire Bros., Cortland, N. Y.
Wisconsin Wire Works, Appleton, Wis.

COATING COMPOUNDS—
Amchem Products, Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corp., Brooklyn, N. Y.
Miller, R. H., Co., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.
U. S. Borax, New York, N. Y.

COLOR CONCENTRATES—For Wire Coatings
Blane Corporation, The, Canton, Mass.

COMPOUNDS—Brazing
Steele Company, M. G., Rome, N. Y.

COMPOUNDS—Coppering
Amchem Products, Inc., Ambler, Pa.
Circle Chemical Co., Chicago, Ill.
Miller, R. H. Co., Inc., Homer, N. Y.

COMPOUNDS—Diamond (Pre-Mixed)
Alabama Wire Die Co., Fayette, Ala.
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

COMPOUNDS—Extrusion, for Wire
Amchem Products, Inc., Ambler, Pa.
Blane Corporation, The, Canton, Mass.
Circle Chemical Co., Chicago, Ill.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.

COMPOUNDS—For Improving Drawing & Extrusion
Amchem Products, Inc., Ambler, Pa.
Circle Chemical Co., Chicago, Ill

COMPOUNDS—Metal Finishing
Amchem Products Inc., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Circle Chemical Co., Chicago, Ill.

COMPOUNDS—Phosphate Coating
Amchem Products Inc., Ambler, Pa.
Circle Chemical Co., Chicago, Ill.

COMPOUNDS—Rust Preventing
Amchem Products, Inc., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Apex Alkali Products Co., Philadelphia, Pa.
Circle Chemical Co., Chicago, Ill.

COMPOUNDS—Rust Removing
Amchem Products, Inc., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corp., Brooklyn, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

COMPOUNDS—Vinyl
Blane Corporation, The, Canton, Mass.
Kenrich Petrochemicals, Inc., Maspeth, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Union Carbide Plastics Company, Div. of Union Carbide Corporation, New York, N. Y.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Climax Molybdenum Co., Div., American Metal Climax, Inc., New York, N. Y.
Magnuson Products Corp., Brooklyn, N. Y.
Miller, R. H. Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.
Swift & Company, Chicago, Ill.
U. S. Borax, New York N. Y.

CONDUCTORS—Flexible, Electrical
Hudson Wire Co., Ossining, N. Y.
Laribee Wire Inc., Camden, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

CONTAINERS—Wire Packaging
(See DRUMS—Wire Packaging)

CONTROL PANELS—
Walco Electric Co., Providence, R. I.

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

COUNTERS—
(See MACHINERY—Measuring Wire and Cable)

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Morgan Construction Co., Worcester, Mass.

CUTTING TOOLS—Carbide
Eastern Carbide Corp., New Rochelle, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.

CUTTING TOOLS—Wire
Manco Mfg. Co., Bradley, Ill.
Porter, H. K., Inc., Somerville, Mass.
Robinson, M. W. Co., Rockville, Conn.

DIAMONDS—Industrial
Alabama Wire Die Co., Fayette, Ala.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Indiana Wire Die Co., Ft. Wayne, Ind.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIAMOND POWDERS—
Danforth Company, C.W., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Fort Wayne Diamond Products, Inc., Fort Wayne, Indiana
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIAMOND POWDER RECLAIMING—
Alabama Wire Die Co., Fayette, Ala.
Danforth Company, C.W., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Fort Wayne Diamond Products, Inc., Fort Wayne, Indiana
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Wayne Wire Die Co., Linden, N. J.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Cold Heading
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.

DIES—Diamond
Alabama Wire Die Co., Fayette, Ala.
Ajax Industrial Supplies, Inc., Ft. Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J. Inc., New York, N. Y.
Brenon, Inc., Nixon, N. J.
Ft. Wayne Wire Die Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
National Wire Die Co., Inc., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES DIAMOND—Controlled Drawing Angle
Hoosier Wire Die, Inc., Fort Wayne, Ind.

DIES DIAMOND—Reversible
National Wire Die Co., Inc., New York, N. Y.

DIES—Extrusion
Alabama Wire Die Co., Fayette, Ala.
Central Tool and Machine Co., Bridgeport, Conn.
Eastern Carbide Corp., New Rochelle, N. Y.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N.Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.

DIES—Nail, Nail Cutters, Feeder Blocks, Grippers, etc.
Pittsburgh Carbide Die Co., Monongahela, Pa.

DIES—Pointing
Fenn Manufacturing Co., Newington, Conn.
Sjogren Tool & Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Brenon, Inc., Nixon, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
National Wire Die Co., Inc., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.

DIES—Swaging
Fenn Manufacturing Co., Newington, Conn.
Sjogren Tool & Mach. Co., Inc., Auburn, Mass.

DIES—Tinning
Roux Wire Die Works, Inc., Oriskany, N. Y.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRIVES—Variable Speed
Allis Co., Louis, Milwaukee, Wisc.
Walco Electric Co., Providence, R. I.

DRUMS—Wire Packaging
Hubbard Spool Company, Div., Van Norman Industries, Inc., Garrett, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

DRUMS & TRAVERSES—For Cable Reels
Hubbard Spool Company, Div., Van Norman Industries, Inc., Garrett, Ind.
Republic Steel Corp., Berger Div., Canton, Ohio

DRYING EQUIPMENT—
Carl Mayer Corp., The, Cleveland, Ohio

DUST COLLECTORS—Wet or Dry
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.

ENGINEERS—Consulting
Bawden, William D., Wilton, Conn.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FOAM PRODUCING COMPOUNDS—
Amchem Products, Inc., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Annealing, Vacuum
American Laubscher Corporation, New York, N. Y.

FURNACES—Brazing
Ajax Electric Company, Philadelphia, Pa.

FURNACES—Galvanizing Equipment
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Company, Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)
Wilson Lee Engr. Co., Cleveland, Ohio

FURNACES—Pot (Oil, Gas, Electric)
Ajax Electric Company, Philadelphia, Pa.
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)

FURNACES—Salt Bath
Ajax Electric Company, Philadelphia, Pa.

FURNACES—Strand Annealing
Ajax Electric Company, Philadelphia, Pa.
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)

GALVANIZING EQUIPMENT—(See MACHINERY—Galvanizing Wire)

GUIDES—For Wire
Alabama Wire Die Co., Fayette, Ala.
Heany Industrial Ceramic Corp., New Haven, Conn.
Indiana Wire Die Co., Fort Wayne, Ind.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging
Sjogren Tool & Machine Co., Auburn, Mass.

HOISTS—Electric
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Walco Electric Co., Providence, R. I.

INHIBITORS—Pickling
Amchem Products, Inc., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INKS—Printing, for Insulated Wire
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Company, West Hanover, Mass.

INSULATING MATERIALS—
Blane Corporation, The, Canton, Mass.
Dow Corning Corporation, Midland, Mich.
General Electric Company, Insulating Materials Section, Schenectady, N. Y.
Kenrich Petrochemicals, Inc., Maspeth, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.

LACQUERNG SYSTEMS—See MACH.—Lacquering Electric Wire

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Climax Molybdenum Co., Div., American Metal Climax, Inc., New York, N. Y.
Swift & Co., Chicago, Ill.

MACHINE CONTROLS—Electronic
Allis Co., Louis, Milwaukee, Wisc.

MACHINERY—Armoring (Cable, Wire, Hose)
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.

MACHINERY—Barbed Wire
Glader Wm., Machine Works, Chicago, Ill.

MACHINERY—Blast Cleaning
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.

MACHINERY—Bobbin Winders
Hanson & Edwards, Ltd., Warrington, England

MACHINERY—Bolt, Rivet, Screw, etc.
Gavlick Machinery Corporation, Bridgeport, Conn.
National Machinery Co., Tiffin, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.

MACHINERY—Braiding
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Fall, R. I.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Brazers for Wire
Steele Company, M. G., Rome, N. Y.

MACHINERY—Bunching
Cook Mfg. Co., The, Paterson, N. J.
Edmands Company, The, Cranston, R. I.
Hanson & Edwards, Ltd., Warrington, England
Haskell-Dawes Machine Co., Philadelphia, Pa.
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Niehaus K. A. Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Cable, Electric
Cook Mfg. Co., The, Paterson, N. J.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Capstans and Machinery—Winding Wire)

MACHINERY—Centerless Grinding & Polishing
American Laubscher Corp., New York, N. Y.

MACHINERY—Chain Link Fence
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Chain Making
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Closing Cable
Miyazaki Iron Works, Ltd., Osaka, Japan
Niehaus, K. A. Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Coulter & MacKenzie Machine Co., Bridgeport, Conn.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.

MACHINERY—Cold Forging
National Machinery Co., Tiffin, Ohio
Unitech Products, Inc., Hartford, Conn.

MACHINERY—Cold Heading
National Machinery Co., Tiffin, Ohio
REM Sales Incorporated, Subsidiary of The Robert E. Morris Co., West Hartford, Conn.
Straus-Artys Corp., Great Neck, N. Y.
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Cook Mfg. Co., The, Paterson, N. J.
Herborn Machinery Corporation, Hackensack, N. J.
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., New York, N.Y.
Morgardshammars Mek Verkstads A. B., Morgardshammar, Sweden
National Mach'y Exch., (Used), New York
Showa Machine Works, Ltd., Osaka, Japan
Straus-Artys Corp., Great Neck, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.
Whitacre Corporation, Alhambra, California

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)
Eisler Engineering Company, Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Cutters, Hydraulic for Rod & Bar
Manco Mfg. Co., Bradley, Ill.
Porter, H. K., Inc., Somerville, Mass.

MACHINERY—Dead Block (Stationary Coiler)
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wells Company, Frank L., Kenosha, Wisc.
Whitacre Corporation, Alhambra, California
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Descaling Rod, Dry
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Fisher Associates, New York, N. Y.
Herborn Machinery Corporation, Hackensack, N. J.
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Die Making
Alabama Wire Die Co., Fayette, Ala.
Boulin, Victor J., Inc., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Sjogren Tool & Machine Co., Auburn, Mass.
Wayne Wire Die Co., Linden, N. J.

MACHINERY—Draw Benches
American Laubscher Corp., New York, N. Y.
Gavlick Machinery Corporation, Bridgeport, Conn.
Loma Machine Manufacturing Co., New York, N. Y.
Morgan Construction Co., Worcester, Mass.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Edging (See MACHINERY—Tandem Rolling and Edging Mills)

MACHINERY—Enameling
Acrometal Products, Inc., Minneapolis, Minn.
American Insulating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Cold Forging Machines, Inc., Elyria, Ohio

MACHINERY—Extruding
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
Johnson Machinery Co., Elizabeth, N. J.
Royle, John, & Sons, Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Flat Wire
Fenn Manufacturing Co., Newington, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Loma Machine Manufacturing Co., New York, N. Y.
Mettler Machine Tool, Inc., New Haven, Conn.
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Steel Equipment Company, Cleveland, Ohio
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Forming Wire
Cold Forging Machines, Inc., Elyria, Ohio
Gavlick Machinery Corporation, Bridgeport, Conn.
National Mach'y Exch., (Used), New York, N. Y.
Straus-Artys Corp., Great Neck, N. Y.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Galvanizing Wire
Miyazaki Iron Works, Ltd., Osaka, Japan
Ofenbau Fritz G.m.b.H. & Co., K. G., Hagen, (W.-Germany)
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Whitacre Corporation, Alhambra, California
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle Manufacturing Corporation, Providence, R. I.

MACHINERY—Insulating Wire
American Insulating Mach'y. Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine), France
Royle, John & Sons, Paterson, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.

MACHINERY—Insulation Testing (See MACHINERY—Spark Testing)

MACHINERY—Lacquering Electric Wire
Cook Mfg. Co., The, Paterson, N. J.

MACHINERY—Lock Washer
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Looms, Wire Weaving
Cold Forging Machines, Inc., Elyria, Ohio
EVG., Machinen & Stahl, A. G., Zurich, Switzerland

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wisc.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.

MACHINERY—Measuring and Control—Coating
Davis-Standard, Div. of Franklin Research and Development Corp., Mystic, Conn.

MACHINERY—Nail and Tack
Cold Forging Machines, Inc., Elyria, Ohio
Glader, Wm., Machine Works, Chicago, Ill.
National Machinery Co., Tiffin, Ohio
National Mach'y Exch. (Used), N.Y., N.Y.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Packaging Wire
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Whitacre Corporation, Alhambra, California

MACHINERY—Patenting Wire
Ofenbau Fritz G.m.b.H. & Co., K. G., Hagen, (W.-Germany)
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Whitacre Corporation, Alhambra, California

MACHINERY—Pin
REM Sales Incorporated, Subsidiary of The Robert E. Morris Company, West Hartford, Conn.

MACHINERY—Plating
Bartell Machine Tool Corp., Rome, N. Y.
Cold Forging Machines, Inc., Elyria, Ohio
Universal Industrial Equipment Co., Secaucus, N. J.

MACHINERY—Pointing
Herborn Machinery Corporation, Hackensack, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch., (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Straus-Artys Corp., Great Neck, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.

MACHINERY—Preheaters, Wire
Walco Electric Co., Providence, R. I.

MACHINERY—Printing on Electric Wire
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Co., West Hanover, Mass.
Gillies, Duncan M., Co., Inc., West Boylston, Mass.

MACHINERY—Re-Spooling
Acrometal Products, Inc., Minneapolis, Minn.
Bartell Machine Tool Corp., Rome, N. Y.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Miyazaki Iron Works, Ltd., Osaka, Japan
National Mach'y Exch. (Used), New York, N. Y.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y Inc., (used), Pawtucket, R. I.

MACHINERY—Rod Mill
Herborn Machinery Corporation, Hackensack, N. J.
Morgan Construction Co., Worcester, Mass.

MACHINERY—Rolling Mill
Fenn Manufacturing Co., Newington, Conn.
Loma Machine Manufacturing Co., New York, N. Y.
Morgan Construction Co., Worcester, Mass.
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
Royle, John & Sons, Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y Inc., (used), Pawtucket, R. I.

MACHINERY—Serving
Pourtier Pere et Fils, Romainville (Seine), France
Wardwell Braiding Machine Co., Central Falls, R. I.

MACHINERY—Slitting Mills
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Steel Equipment Company, Cleveland, Ohio

MACHINERY—Special
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Spring Making
Cold Forging Machines, Inc., Elyria, Ohio
Gavlick Machinery Corporation, Bridgeport, Conn.
National Mach'y Exch., (Used), New York, N. Y.
Wafios Machinery Corp., Hackensack, N. J.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Straightening & Cutting
American Laubscher Corp., New York, N. Y.
Cold Forging Machines, Inc., Elyria, Ohio
Gavlick Machinery Corporation, Bridgeport, Conn.
Johnson Machinery Co., Elizabeth, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Loma Machine Manufacturing Co., New York, N. Y.
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N.Y.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wafios Machinery Corp., Hackensack, N. J.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Stranding
Bartell Machine Tool Corp., Rome, N. Y.
Cold Forging Machines, Inc., Elyria, Ohio
Hanson & Edwards, Ltd., Warrington, England
Haskell-Dawes Machine Co., Phila., Pa.
Johnson Machinery Co., Elizabeth, N. J.
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Superior Tool & Manufacturing Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Fenn Manufacturing Co., Newington, Conn.
Gavlick Machinery Corporation, Bridgeport, Conn.

MACHINERY—Tandem Rolling & Edging Mills
Fenn Manufacturing Co., Newington, Conn.
Loma Machine Manufacturing Co., New York, N. Y.
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.

MACHINERY—Take-Up and Pay-Out
Acrometal Products, Inc., Minneapolis, Minn.
American Insulating Mach'y Co., Phila., Pa.
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Fenn Manufacturing Co., Newington, Conn.
Johnson Machinery Co., Elizabeth, N. J.
Miyazaki Iron Works, Ltd., Osaka, Japan
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine) France
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Standard Mill Supply Co., Pawtucket, R. I.
Steel Equipment Company, Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.
Whitacre Corporation, Alhambra, California

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine) France
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Thread Rolling
Mettler Machine Tool, Inc., New Haven, Conn.
Straus-Artys Corp., Great Neck, N. Y.
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Tinning Wire
American Insuating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Litzler Co., C. A., Cleveland, Ohio

Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)
Universal Industrial Equipment Co., Secaucus, N. J.
Whitacre Corporation, Alhambra, California

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, Ohio

MACHINERY—Tube Mill, Cold Drawing
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., New York, N. Y.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N.J.
Edmands Company, The, Cranston, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
Gavlick Machinery Corporation, Bridgeport, Conn.
Johnson Machinery Co., Elizabeth, N. J.
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Variable Speed Drives
Allis Co., Louis, Milwaukee, Wisc.

MACHINERY—Welded Wire Mesh
EVG, Maschinen und Stahl, A.G., Zurich, Switzerland
Sommer Products Company, Peoria, Ill.

MACHINERY—for Wire Welding
(See WELDERS—Butt and Spot and Machinery—Welding Wire Fabrics)

MACHINERY—Winding Wire
Davis Electric Co., Wallingford, Conn.
Davis-Standard Div. of Franklin Research and Development Corp., Mystic, Conn.
Emory Company, Robert J., Newark, N. J.
Enjaco Corporation, Cranston, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Standard Mill Supply Co., Pawtucket, R. I.
Steel Equipment Company, Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.

MACHINERY—Wire Drawing
American Laubscher Corporation, New York, N. Y.
Cook Manufacturing Co., The, Paterson, N.J.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Fenn Manufacturing Co., Newington, Conn.
Gavlick Machinery Corporation, Bridgeport, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., New York, N. Y.
Miyazaki Iron Works, Ltd., Osaka, Japan
Morgan Construction Co., Worcester, Mass.
Morgardshammars Mek Verkstads AB, Morgardshammar, Sweden
National Mach'y Exch. (Used), New York, N. Y.
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Showa Machine Works Ltd., Osaka, Japan
Societa Generale Delle Macchine Mill, Milan, Italy
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Straus-Artys Corp., Great Neck, N. Y.
Superior Tool & Machinery Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Wartenweiler, Emilio, Milano, Italy—SAMP
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.
Whitacre Corporation, Alhambra, California
Wire Machinery Inc., Chicago, Ill.

MACHINERY—Wire Rope
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
American Laubscher Corp. New York, N. Y.
Larmuth (1947) Ltd., Cheshire, England

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio

MOLYBDENUM-DISULFIDE—Lubricants
Climax Molybdenum Company, a division of American Metal Climax, Inc., New York, N. Y.

MOTORS—Electric
Allis Co., Louis, Milwaukee, Wisc.
Walco Electric Co., Providence, R. I.

NAIL TOOLING—Tungsten Carbide
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Brothers, Inc., Cortland, N. Y.

NIPPERS—Wire Cutting
Robinson, M. W. Co., Rockfall, Conn.

NOZZLES—For Extruding Machines
Central Tool and Mach. Co., Bridgeport, Conn.

OVENS—Cable Lacquering and Enameling
American Insulating Mach'y Co., Phila., Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Colbourne Machine Co., Winsted, Conn.

OVENS—Rod Bakers
Carl Mayer Corp., The, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl Mayer Corp., The, Cleveland, Ohio

PAILS—Packaging
(See Drums—Wire Packaging)

PAPER—Coil Wrapping
Ludlow Corporation, Needham Heights, Mass.

PAPER—Insulating
Ludlow Corporation, Needham Heights, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

PAY-OUT SYSTEMS—
(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS
(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PLASTICIZERS—
Kenrich Petrochemicals, Inc., Maspeth, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.

PLASTICS—for Wire Insulation
Blane Corporation, The, Canton, Mass.
Dow Corning Corporation, Midland, Mich.
Kenrich Petrochemicals, Inc., Maspeth, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Union Carbide Plastics Company, Div. of Union Carbide Corporation, New York, N. Y.
Union Carbide Corporation, Silicones Division, New York, N. Y.

PREHEATERS—Wire
Walco Electric Co., Providence, R. I.

PRINTING WHEELS—for Electric Wire
Daniels & Co., Frank, New York, N. Y.
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Co., Inc., West Hanover, Mass.
Gillies, Duncan M., Co., Inc., West Boylston, Mass.

PULLERS AND GRIPS—for Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool & Mach. Co., Auburn, Mass.

RACKS—Wire Storage
Jarke Manufacturing Co., Chicago, Illinois

REEL AND TENSION STANDS—
Acrometal Products, Inc., Minneapolis, Minn.
Mettler Machine Tool, Inc., New Haven, Conn.
Northern Indiana Steel Supply Co., Michigan City, Ind.
Standard Mill Supply Co., Pawtucket, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Merrimac Spool & Reel Co., Inc., Haverhill, Mass.
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Republic Steel Corp., Berger Div., Canton, Ohio

REELS & SPOOLS—Custom Made
Merrimac Spool & Reel Co., Inc., Haverhill, Mass.

REELS—Metal Bound
Durkee Mfg. Co., Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.

REELS—Plywood
Antrim Reel, Inc., Haverhill, Mass.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Carlton Manufacturing Co., Pawtucket, R. I.
Clark Manufacturing Co., J. L., Rockford, Illinois
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Merrimac Spool & Reel Co., Inc., Haverhill, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Northern Indiana Steel Supply Co., Michigan City, Ind.
Republic Steel Corp., Berger Div., Canton, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Nelson Co., The, Baltimore, Md.
Northern Indiana Steel Supply Co., Michigan City, Ind.
Republic Steel Corp., Berger Div., Canton, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Wood
American Wood Working Co., Montello, Wisc.
Antrim Reel, Inc., Haverhill, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co., Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Nelson Co., The, Baltimore, Md.

ROD BAKERS—
(See OVENS—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio

RODS—Wire—Non-Ferrous
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Eaton Mfg. Co., Massillon, Ohio
Keystone Steel & Wire Co., Peoria, Ill.
Niederrheinische Huette, A. G., Duisburg, Germany
Sumitomo Metal Industries, Ltd., Osaka, Japan
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Yawata Iron & Steel Co., Ltd., Tokyo, Japan

ROPE—Wire
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons, Div., Colorado Fuel & Iron Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See COMPOUNDS—RUST Removing)

RUST REMOVING COMPOUNDS—
(See COMPOUNDS—RUST Preventing)

SCRAP WIRE—Bare or Insulated, Bought
Electro Metals Separation Co. Div. of M. J. Stavola & Co., Inc., Danbury, Conn.

SILICONE RUBBER—For Wire Insulation
Dow Corning Corporation, Midland, Mich.

SOAPS—Industrial and Wire Drawing
(See COMPOUNDS—Wire Drawing)

SPOOLS—For Retail Sale of Wire
Antrim Reel, Inc., Haverhill, Mass.
Carlton Manufacturing Co., Pawtucket, R. I.
Clark Manufacturing Co., J. L., Rockford, Illinois

SPOOLS—Paper
Merrimac Spool & Reel Co., Inc., Haverhill, Mass.

SPOOLS—Plastic
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Merrimac Spool & Reel Co., Inc., Haverhill, Mass.
Plastic Mold & Eng. Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.

STAMPINGS—Steel
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.

STOCK STORAGE SYSTEMS—
Jarke Manufacturing Co., Chicago, Illinois

STRAND—Galvanized Steel
Southwire Co., Carrollton, Ga.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.

TANKS—Ceramic, for Galvanizing
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)

TENSION METERS—for Wire
Boulin Instrument Corp., Pelham, N. Y.
Tensitron, Inc., Harvard, Mass.

TESTERS—INSULATION
(See Testing Equipment—for Dielectric Faults)

TESTING EQUIPMENT—Dielectric Faults in Insulation
Davis Electric Co., Wallingford, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Peschel Electronics, Inc., Patterson, N. Y.

TESTING EQUIPMENT—Physical
Scott Testers, Inc., Providence, R. I.
Steele Company, M. G., Rome, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper Silver and False Gold Coated, etc.
(See TINSEL-Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

TRANSMISSIONS—Variable Speed (See Adjustable Speed Drives)

TRAVERSE & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.

VARNISHES & LACQUERS—for Electric Wire
General Electric Company, Insulating Materials Section, Schenectady, N. Y.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.

WELDERS—Spot and Butt and Welding Wire Fabrics
Eisler Engineering Corp., Newark, N. J.
EVG, Maschinen and Stahl, A.G., Zurich, Switzerland
Herborn Machinery Corporation, Hackensack, N. J.
Micro Products Co., Chicago, Ill.
Sommers Products Company, Peoria, Ill.

WHEELS—for Printing on Electric Wire
Daniels & Co., Frank, New York, N. Y.
Gem Gravure Company, West Hanover, Mass.
Gillies, Duncan M., Co., Inc., West Boylston, Mass.

WIRE—ACSR
Southwire Co., Carrollton, Ga.

WIRE—Aluminum
Hudson Wire Co., Ossining, N. Y.
Malin & Co., The, Cleveland, Ohio
Southwire Co., Carrollton, Ga.

WIRE—Ball
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Ball & Roller Bearing
Eaton Mfg. Co., Massillon, Ohio

WIRE—Barbed
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

WIRE—Brake Lining
Hudson Wire Co., Ossining, N. Y.

WIRE—Brass and Bronze
Malin & Co., The, Cleveland, Ohio
Wisconsin Wire Works, Appleton, Wis.

WIRE—Brush
Hudson Wire Co., Ossining, N. Y.
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.

WIRE—Building, Electric
Southwire Co., Carrollton, Ga.

WIRE—Bunched and Stranded
Camden Wire Co., Camden, N. Y.
Laribee Wire, Inc., Camden, N. Y.

WIRE—Cadmium
Stamford Processing Co., Peekskill, N. Y.

WIRE—Cold Heading
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Pittsburgh Steel Co., Pittsburgh, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Copper
Camden Wire Co., Camden, N. Y.
Hudson Wire Co., Ossining, N. Y.
Laribee Wire, Inc., Camden, N. Y.
Malin & Co., The, Cleveland, Ohio
Southwire Co., Carrollton, Ga.

WIRE—For Electrical Conductors
Camden Wire Co., Camden, N. Y.
Laribee Wire, Inc., Camden, N. Y.

WIRE—Flat
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Montgomery Co., The, Windsor Locks, Conn.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Galvanized
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—High Carbon
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Detroit Steel Corporation, Detroit, Mich.
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.

WIRE—Insulated
Southwire Co., Carrollton, Ga.

WIRE—Manufacturers
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Berger Div., Canton, Ohio
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Rylands Brothers Limited, Warrington, England
U. S. Steel Corp., N. Y., N. Y.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Metalizing
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WIRE—Music
Malin & Co., The, Cleveland, Ohio

WIRE—Needle
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.

WIRE—Nickel Alloy
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Nickel Silver and Phosphor Bronze
Malin & Co., The, Cleveland, Ohio
Wisconsin Wire Works, Appleton, Wis.

WIRE—Oil Tempered
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Malin & Co., The, Cleveland, Ohio
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Preheaters
Waico Electric Co., Providence, R. I.

WIRE—for Prestressed Concrete
Rylands Brothers, Limited, Warrington, England

WIRE—Pin
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.

WIRE—Special Shapes
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Eaton Mfg. Co., Massillon, Ohio
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Spring
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Stainless Steel
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Malin & Co., The, Cleveland, Ohio
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Nippon Stainless Steel Wire Mfg. Co., Ltd., Osaka, Japan.
Pittsburgh Steel Co., Pittsburgh, Pa.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Steel—Also Coppered and Galvanized Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Malin & Co., The, Cleveland, Ohio
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Rylands Brothers, Limited, Warrington, England
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Stranded & Bunched
Hudson Wire Co., Ossining, N. Y.
Laribee Wire, Inc., Camden, N. Y.

WIRE—Tinned
Camden Wire Co., Camden, N. Y.
Laribee Wire, Inc., Camden, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WRAPPING PAPER—Creped
(See PAPER-Creped Wrapping)

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

YARNS—Wire Insulating
Chadwick Yarn Company, Pawtucket, R. I.
Synthetic Thread Co., Bethlehem, Pa.

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ESTABLISHED 1845

PATERSON 16, NEW JERSEY, U. S. A.

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AND MASTICATING MACHINERY MANUFACTURERS

WATSON

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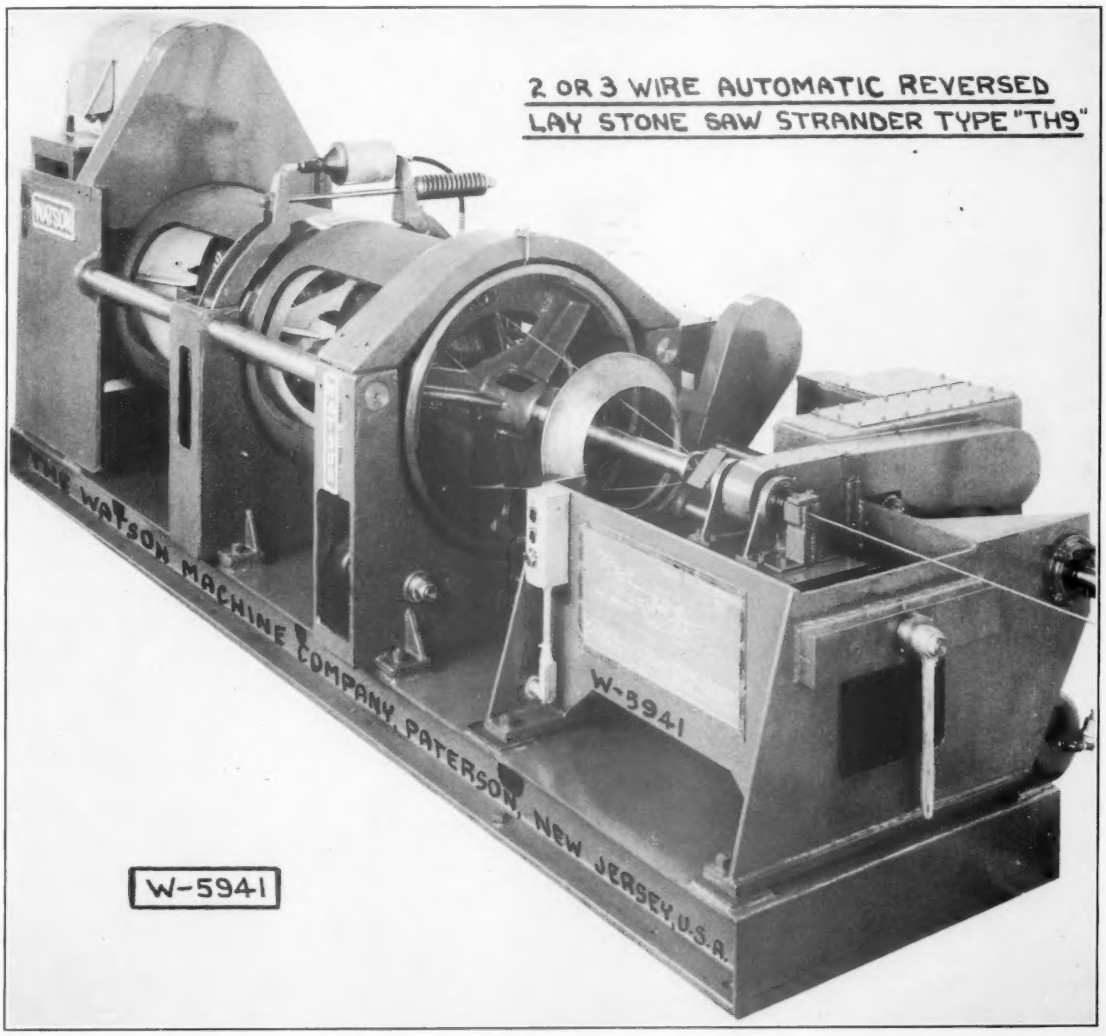
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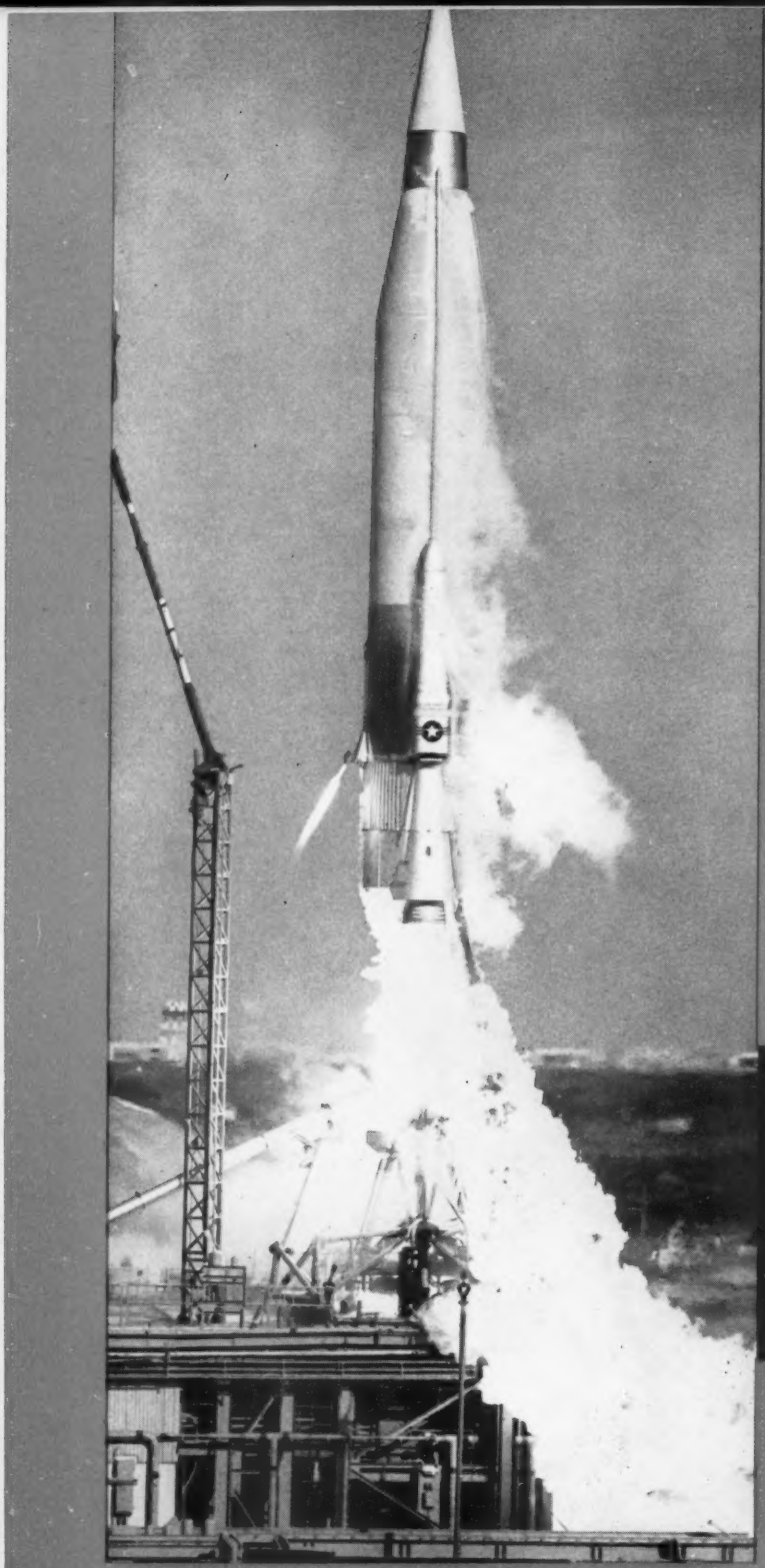
Our Design Aims: SAFETY — SIMPLICITY — PRODUCTIVITY



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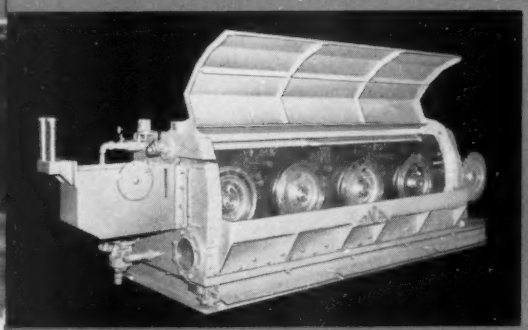

Syncro Model F-13 Heavy Duty Rod Breakdown Machine—entering 3/8" soft copper rod with finished sizes ranging from #4 to #14 B&S gauge drawn at maximum operating speeds. This is only one of a complete line of Wire Drawing and Stranding Machines, that set the standard for the Wire Industry, manufactured by Syncro Machine Company.

For further information write to: Syncro Machine Company, Perth Amboy, New Jersey

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